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Being Solicitous Or Getting Even?



There is a Roald Dahl short story about a nasty, controlling man who made his wife miserable. When his heart stopped, she had his brain, still apparently living and still attached to his eyes, removed and placed in a solution that allowed them to remain alive. The husband had commanded his wife to maintain his organs. Her revenge was to do just that, and to drink and smoke, vices that enraged her husband, directly in front of the disembodied eyes. She thought she could discern the helpless rage she caused in the contractions of the pupils.

Sometimes I wonder about the family members, usually children, who appear overly solicitous about their severely impaired relatives. In the hospital we frequently see families confronting terribly conflicting emotions as they try to do “the right thing” in choosing a level of medical intervention for the sick relative.

An 85 year-old mother was independent, living a full life and suddenly has a major stroke. She wouldn’t want to live if she were very impaired; but, on the other hand, she enjoyed enough things in life that she would very much want to remain alive if the deficits were mild. But we also see the conflicts when the elderly patient, so demented that he doesn’t recognize his wife or children, is admitted with a new stroke, pneumonia and heart attack. As the show’s title aptly asks, “Whose life is it anyway?”

Although we all know that death is certain, we don’t all accept it. Disney’s “Circle of Life” in the movie, *The Lion King*, shows death, with its sting removed. Simba, the father lion, doesn’t really die. He is transformed into clouds, voices and feelings, less palpable but more permanent. Unfortunately, for most of us, death is permanent. When dad dies, he is gone forever; and even though this is often a welcome relief for a suffering person and family, there are family members who can’t let go.

I am sometimes troubled by the denial family members practice to personally justify their requests for aggressive medical interventions for a chronically ill, mentally incompetent family member. While I may see a completely dependent, 88 year-old who is mute and without comprehension for even the simplest of requests shouted loudly into an ear, I am told, “Oh, Dad’s playing games again. He’s really sharp at home, knows what’s going on and eats up a storm.” While there is no gainsaying the fact that dad’s care has been meticulous, no pressure sores, clean clothes, stable weight, hence no whiff of abuse, I worry about motivation. Is there an underlying agenda? Then I wonder about myself. Am I so insensitive, so ageist, so limited that I cannot see the children repaying dad for his years of providing and caring for them? Or am I correct to perceive the Roald Dahl scenario being played out in another venue, with me as physician being complicit? Are the children forcing dad to survive as long as possible, although he may not even know his name or who his children are, seemingly reduced to blinking and digestive functions as the only overt signs of life? Is this a convoluted form of torture perhaps occurring to assuage a sense of guilt for not being a “good enough” child?

I doubt that the children see it that way. For them it’s the problem of “letting go.” Yet mom is not the same person as the woman who raised them. Each day is not a good day and every succeeding day is going to be worse. Would the children want this for themselves if they became infirm and incompetent?

Is this inability to let go a punishment? While the children are no longer physically dependent on mom, maybe they have become emotionally dependent on providing care? A dependent parent has provided a purpose in life. At what point does this purpose conflict with the “best interests” of the patient,

and a parallel issue, who decides the “best interests of the patient?”

We occasionally read newspaper reports of awful cases where a spouse, debilitated and demented, is killed by the surviving, loving spouse. “She wouldn’t have wanted to go on. She told me that if she ever got to be in this state to please put her out of her suffering.” “I couldn’t stand seeing her suffer like this.” We sympathize with the plight of the surviving spouse. But what do we think of the opposite response? What if the spouse wants “everything” done to save the incompetent and enfeebled mate? Antibiotics and intubation for pneumonia. Cardiac resuscitation. All stops pulled. What is this behavior? Is “letting go” personal weakness or obeying the drive of a love my own limitations prevent me from comprehending? I worry that sometimes it represents a time for evening up old scores and that I’m being asked to be complicit.

What are my obligations? If the patient had told me, prior to becoming incompetent, what he wanted done, then my duties are clearer, yet even then we know that people change their minds. Generally patients deteriorate slowly and don’t address these issues in a timely manner. Often I first meet the patient after he’s become incompetent. Is it my role to tell a family they’re acting “wrongly?” I don’t think so. Should I tell them they make me uncomfortable? That’s the same as telling them their behavior is wrong. I’m not a family member. Their ethics and principles and mine may be quite different and who’s to say one set is better?

While advance directives help, they do not solve this problem.

— Joseph H. Friedman, MD

A Tale of Rats, Plague and People



Myths and fairy tales often hint at deeper truths too painful to be talked of plainly. Consider the curious tale of the pied piper of Hamelin, summarized in many stories, including those told by the Grimm brothers and the poet Robert Browning.

The year was 1376 and the quiet town of Hamelin, on the river Weser, was enjoying its tranquility and prosperity when suddenly it was overwhelmed by an army of rats. All customary anti-rodent measures had failed and the townsfolk were left with no answer to their rodent problem. A piper, dressed in oranges and reds, appeared and offered to rid their town of rats for a fee of a thousand florins. The mayor readily agreed and the next early morning the piper played a beguiling tune as he walked slowly through Hamelin, followed by swarms of rats, all of whom plunged into the flowing Weser River and drowned. The townsfolk were overjoyed but then refused to pay the agreed-upon fee. And so the piper now played yet another appealing tune; and all of the Hamelin children followed him, ultimately to disappear within a distant cave never to be seen again.

It is a grim, cautionary tale of rats, broken pledges and the loss of children. It hints that rats carry a menace more substantial than their status as distasteful rodents; and that they might be somehow associated with the loss of young lives.

Curiously, there is no mention of rats, as distinguished from mice, either in Scriptural sources or in the writings of ancient Greece. The first mention of the black rat, sometimes called the ship rat, coincides with the return of European warriors from the first Crusade. Its origins are obscure, but most likely the black rat took origin somewhere in central Asia. From the eleventh Century on, the black rat spread rapidly through most of Europe, parasitizing man in his dwellings, his grain storage warehouses and in his ships.

Cats were initially used to control the voracious city rats of the Middle Ages although certain dogs, especially the terriers and the spirited German miniature Schnauzers were particularly skillful in catching and killing rats. But even these animals were insufficient to stay the burgeoning growth of the rat population and some humans took on rat-catching as a needed profession. The townships in medieval Germany paid a specified amount for each severed rat tail. And rat tails, for a while, became an alternative urban currency. The Jews of 15th Century Frankfurt, in addition to other taxes, were required to deliver 5,000 rat tails annually to the town authorities.

Prior to the mid-14th Century, the black rats of Europe were hated chiefly because of their habit of burrowing into stored food supplies such as grain depots, consuming precious food meant for human consumption. These animals were equally destructive of wood structures and clothing and would occasionally attack sleeping infants and young children.

In the mid-14th Century, historians claim that it was in the year 1347, a Venetian ship left the Crimean region, then under siege, and sailed west to land in Sicily. On board were many black rats, not an unusual happening. But these particular black rats carried a pestilence then endemic to central Asia, a disease now called bubonic plague but then referred to as the black death.

Bubonic plague is a bacterial disease primarily of rodents; and were it not for man's need to build houses, it is likely that the plague would have remained largely a disease of lower animals. But man's houses, especially those with thatched roofs, provided a congenial dwelling place for the black rat. It offered him a haven, warmth and ready access to man's food supplies. [Both man and rats are omnivorous and share a similar diet.] Now, however, some of these rats were infected with bubonic plague; and as they perished, their fleas - carriers of the germs of the plague - sought out other rats to parasitize. But the close proximity of humans, especially children, gave the infected fleas an alternative host and by biting the sleeping children they necessarily passed on the plague germs to humans, especially children.

The virulent plague of 1347 spread rapidly, infected virtually all of Europe within a year and killed off an estimated one-fourth of its population. Plague periodically returned to Europe in the ensuing four centuries, some epidemics [such as the one in 1665] being unusually devastating. The last major European outbreak of plague was recorded in southern France in 1721; and then, for reasons still not totally apparent, the onslaught of plague diminished or disappeared.

The decline of the plague in Europe coincided with the appearance of a new species of rat, the brown [sometimes called Norwegian] rat. This creature was somewhat bigger and more aggressive than the black rat; and while the black rat was almost exclusively a house rat living in close proximity to humans, the brown rat tended to live in fields, haystacks, sewers and along river banks [and, contrary to the pied piper tale, was an excellent swimmer]. Thus, some have conjectured, an incidental byproduct of the displacement of the black rat by the brown rat was to diminish the likelihood of infected rat-fleas reaching humans.

Plague had reached American shores by the 19th Century. In 1899, a ship sailing from Hong Kong was said to have carried the plague to California. Isolated cases of the plague appeared in San Francisco; and latent anti-Chinese emotions then flared, causing the local Chinatown to be quarantined while many other states refused to accept goods originated in California. Despite the nationwide furor and President McKinley's antiplague regulations, there were only 122 cases of plague and the epidemic quickly subsided.

The San Francisco earthquake of 1906, however, displaced both humans and rats from their customary homes; and with large numbers of people camping out until proper housing could be provided, an intimate relationship between humans and rats resumed; and a small outbreak of plague was again recorded. By now, the role of the rat was acknowledged and rat-catching helped to bring this to an end.

Rats, as carriers of bubonic plague, epidemic typhus, trench fever and a long roster of other human pestilences, are clearly the second-most lethal mammal on this globe. The dubious distinction of being the most destructive mammal, sadly, is reserved for *Homo sapiens*.

– Stanley M. Aronson, MD, MPH

The Burden of Injury in Rhode Island

Michael J. Mello, MD, MPH

In the United States injuries are the leading cause of death from age 1 to age 35 and one of the top three until age 55.¹ Thus for most of our lives, injuries are a constant and significant threat. That's only the tip of the iceberg, as every death represents only a small number of those who are actually injured. Injury also has high economic impact accounting for 12% of our country's medical spending.² All too often injuries are thought of as "accidents". But injuries are not simply accidents or an unavoidable consequence of human behavior. Injuries happen in definable patterns with predictable populations at risk and times of occurrences. Injuries can be viewed as a disease, like any other, with risk factors for their occurrence. The Injury Prevention Center, affiliated with Rhode Island Hospital, Miriam Hospital, and Hasbro Children's Hospital, works at identifying risks and developing interventions for injury control in Rhode Island. This issue of *Medicine & Health/Rhode Island* explores several common injury patterns and the increased risk of injury in certain groups of Rhode Islanders. Interventions that are being utilized in RI to control injury are also presented.

The relationship of alcohol to motor vehicle crashes and the need for further efforts to reduce this problem are discussed and then further elucidated by two members of the Medical Advisory Board of the RI Division of Motor Vehicles. Dr. Robert Woolard and his group discuss alcohol and injury, presenting data on the additive risk of injury from marijuana. These are both clearly areas of risk reduction that need to be more effectively addressed. Homicide and suicide remain in the top ten causes of death for all age groups after age 1.¹ Firearms are a frequent vector in these injury deaths in RI³ but, because firearms constitute a political "lightning rod" in our country, it is difficult to obtain accurate data on these deaths. An article in this issue describes the need for a comprehensive firearm surveillance system in our state, and nationally to collect this data. Elder Rhode Islanders are a group at increased risk of injury. Dr. Robert Partridge describes the injury patterns that most affect the elderly in our state - falls and motor vehicle trauma. The Providence Safe Communities Partnership has become a national model for the Safe Communities model of injury reduction. Its project director and

10 Leading Causes of Deaths by Age Group - 1998

| Rank | Age Groups | | | | | | | | | | Total |
|------|-------------------------------------|---------------------------------|-----------------------------------|-----------------------------------|------------------------------------|----------------------------------|----------------------------------|--------------------------------------|---------------------------------------|---------------------------------------|--|
| | <1 | 1-4 | 5-9 | 10-14 | 15-24 | 25-34 | 35-44 | 45-54 | 55-64 | 65+ | |
| 1 | Congenital Anomalies 6,212 | Unintentional Injuries 1,931 | Unintentional Injuries 1,544 | Unintentional Injuries 1,710 | Unintentional Injuries 13,349 | Unintentional Injuries 12,045 | Malignant Neoplasms 17,022 | Malignant Neoplasms 45,747 | Malignant Neoplasms 87,024 | Heart Disease 605,673 | Heart Disease 724,859 |
| 2 | Short Gestation 4,101 | Congenital Anomalies 564 | Malignant Neoplasms 487 | Malignant Neoplasms 525 | Homicide 5,506 | Suicide 5,365 | Unintentional Injuries 15,127 | Heart Disease 35,056 | Heart Disease 65,068 | Malignant Neoplasms 384,186 | Malignant Neoplasms 541,532 |
| 3 | SIDS 2,822 | Homicide 399 | Congenital Anomalies 198 | Suicide 317 | Suicide 4,135 | Homicide 4,565 | Heart Disease 13,593 | Unintentional Injuries 10,945 | Bronchitis Emphysema Asthma 10,162 | Cerebrovascular 139,144 | Cerebrovascular 158,448 |
| 4 | Maternal Complications 1,343 | Malignant Neoplasms 365 | Homicide 179 | Homicide 290 | Malignant Neoplasms 1,699 | Malignant Neoplasms 4,385 | Suicide 8,837 | Liver Disease 5,744 | Cerebrovascular 9,653 | Bronchitis Emphysema Asthma 97,896 | Bronchitis Emphysema Asthma 112,121 |
| 5 | Respiratory Distress Synd. 1,295 | Heart Disease 214 | Heart Disease 156 | Congenital Anomalies 173 | Heart Disease 1,057 | Heart Disease 3,207 | HIV 5,746 | Cerebrovascular 5,709 | Diabetes 8,705 | Pneumonia & Influenza 82,989 | Unintentional Injuries 97,835 |
| 6 | Placenta Cord Membranes 961 | Pneumonia & Influenza 146 | Pneumonia & Influenza 70 | Heart Disease 170 | Congenital Anomalies 450 | HIV 2,912 | Homicide 3,567 | Suicide 5,131 | Unintentional Injuries 7,340 | Diabetes 48,974 | Pneumonia & Influenza 91,871 |
| 7 | Perinatal Infections 815 | Septicemia 89 | Bronchitis Emphysema Asthma 54 | Bronchitis Emphysema Asthma 98 | Bronchitis Emphysema Asthma 239 | Cerebrovascular 670 | Liver Disease 3,370 | Diabetes 4,366 | Liver Disease 5,279 | Unintentional Injuries 32,975 | Diabetes 64,751 |
| 8 | Unintentional Injuries 754 | Perinatal Period 75 | Benign Neoplasms 52 | Pneumonia & Influenza 51 | Pneumonia & Influenza 215 | Diabetes 636 | Cerebrovascular 2,650 | HIV 3,120 | Pneumonia & Influenza 3,856 | Nephritis 22,640 | Suicide 30,575 |
| 9 | Intrauterine Hypoxia 461 | Cerebrovascular 57 | Cerebrovascular 35 | Cerebrovascular 47 | HIV 194 | Pneumonia & Influenza 531 | Diabetes 1,885 | Bronchitis Emphysema Asthma 2,828 | Suicide 2,963 | Alzheimer's Disease 22,416 | Nephritis 26,182 |
| 10 | Pneumonia & Influenza 441 | Benign Neoplasms 53 | HIV 29 | Benign Neoplasms 32 | Cerebrovascular 178 | Liver Disease 505 | Pneumonia & Influenza 1,400 | Pneumonia & Influenza 2,167 | Septicemia 2,093 | Septicemia 19,012 | Liver Disease 25,192 |

Source: National Center for Health Statistics, 2000. Chart developed by the National Center for Injury Prevention and Control, CDC.

From: National Center for Injury Prevention and Control. *Injury Fact book 2001-2002*. Atlanta, GA: Centers for Disease Control and Prevention; 2001, 6.

coordinator describe the Partnership and its successful programs in this issue. Dr. Thomas Morgan presents a case to describe how injury biomechanics can be useful in predicting clinical injuries and preventing secondary injury. Although injury prevention is usually thought of occurring on a community-wide distribution, Drs. Shapiro and Simmons discuss the need for injury prevention and control in our medical system. They present an exciting new modality of medical education aimed at medical error reduction that is being developed and utilized here in Rhode Island.

Injury is a force that can be controlled. We must not only focus on the clinical results of injuries, but also identify their cause. For injury control to succeed in our state, the coordinated efforts of state, local and community agencies working with the support of health care providers throughout the state are required. This will obligate everyone to accept their role in injury prevention and control and realize that injuries are preventable and not just "accidents."

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Michael J. Mello, MD, MPH, is Director, Injury Prevention Center, and Clinical Assistant Professor of Medicine Brown Medical School.

CORRESPONDENCE:

Michael J. Mello, MD, MPH
Injury Prevention Center
Physicians Office Bldg.
110 Lockwood Street, Suite 334
Providence, RI 02903
e-mail: mjmello@lifespan.org



Alcohol-Related Motor Vehicle Crashes in Rhode Island

Michael J. Mello, MD, MPH, and Ted D. Nirenberg, PhD

In the year 2000, every two minutes in the United States someone was injured in a motor vehicle crash involving alcohol. Every 32 minutes someone was killed.¹ Although there has been success in motor vehicle safety in the last century, alcohol related crashes rose by 4% from 1999 to 2000.¹ In addition to the 16,653 alcohol related traffic fatalities in 2000, an estimated 310,000 persons were injured in alcohol related crashes.¹

The statistics for Rhode Island are no better. In 2000 the state had 80 traffic fatalities; 51% involved alcohol.² In 1999 the state had 88 traffic fatalities; 41% involved alcohol.³

The problem has not only health consequences to some Rhode Islanders but also economic consequences to all. In 1996, alcohol-related crashes cost the public more than \$2.4 billion, half of which is paid for by people other than the drinking driver.⁴ An estimated 15% of Rhode Island's auto insurance premium is due to alcohol-related crashes.⁴

The state has attempted to address alcohol-related motor vehicle crashes. In 2000, the legislature lowered Rhode Island's prosecution level of intoxication while driving to .08% (80mg/dl) **blood alcohol concentration (BAC)**. In other states, several studies have shown that lowering the levels of BAC helped to reduce alcohol impaired driving.⁵

Nationally, law enforcement of driving under the influence of alcohol or narcotics resulted in 1.4 million arrests in 1998. This has been estimated to be slightly more than 1% of the actual episodes of impaired driving during that year.⁶ Many impaired drivers escape detection and prosecution even after a motor vehicle crash. Research has documented that many of the drivers of a motor vehicle crash who are transported to a hospital escape further legal ramifications of their impaired driving.^{7,8} Increased severity of injury to the driver and increased distance of

the crash site from the hospital both correlated with lower rates of prosecution. In one study that examined the prosecution rates of injured drivers who had serum ethanol levels documented above 0.1%, only 28% were charged and only 17% were convicted.⁷ By escaping prosecution, these drivers not only avoided punishment but also missed a sentinel opportunity to receive help, through court-ordered treatment.

While physicians can advocate for better enforcement of existing laws, they also have a societal responsibility to treat these patients and their underlying alcohol problem. Between 20-30% of the patients seen in US emergency departments have alcohol use problems.⁹ The argument has been made that all emergency department patients should be screened for such problems. In research at Rhode Island Hospital, 21% of sub-critically injured **emergency department (ED)** patients were found to have alcohol intoxication (0.1% BAC).¹⁰ Patients presenting **after 11 pm** had the highest percentage (41%) of intoxication.¹⁰ Research has demonstrated that these

patients with problem drinking are 2.5 times more likely to be readmitted to a trauma center than those without an alcohol problem.¹¹ The incidence of alcohol problems is also consistently high in those involved in motor vehicle crashes. In looking at the full range of motor vehicle crash victims, the incidence of alcohol abuse and dependency is 3.5 times higher than in the general population.¹² Given this highly prevalent population, all motor vehicle crash patients should be screened for alcohol use, allowing treating physicians to intervene at a teachable moment in treating this population.

The **National Institute of Alcohol Abuse and Alcoholism (NIAAA)** has suggested that questions on quantity and frequency be asked to identify patients with risky drinking behaviors. The **CAGE** questionnaire can be used to assess alcohol dependency. (Figure 1). These two screening tools can identify patients who need further interventions. One of the authors (TDN), and other Brown University researchers in a large NIAA-funded study, demonstrated that subcritically

Figure 1. Screening for Alcohol Problems in the Emergency Department

NIAAA Quantity and Frequency Questions

1. On average, how many days per week do you drink alcohol?
2. On a typical day when you drink, how many drinks do you have?
3. What is the maximum number of drinks you had on any given occasion during the last month?

Screen is positive if:

Men > 14 drinks/week or >4 drinks/occasion

Women (and both sexes over 65 years old) > 7drinks/week or >3 drinks/occasion

CAGE (in the last 12 months)

1. Have you ever felt you should Cut down on your drinking?
2. Have people Annoyed you by criticizing your drinking?
3. Have you ever felt bad or Guilty about your drinking?
4. Have you ever had a drink first thing in the morning to "steady your nerves" or get rid of a hangover (Eye Opener)?

Screen is positive if: at least one positive CAGE response

Adapted from: <http://www.acep.org/2,4772.html>

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injured drinkers who received a brief motivational interview in the ED, followed up by a booster session, had fewer alcohol-related negative consequences during the next year.¹³ In addition, patients referred from the ED were surprisingly compliant in keeping appointments for treatment.¹⁴

States have launched a variety of initiatives to reduce the problem of alcohol-impaired driving. As of 2001, five states mandated that health care providers report alcohol impaired drivers by either initiating the report to law enforcement or by cooperating with law enforcements requests. Three states had voluntary reporting laws that allowed but did not mandate health care providers to report to law enforcement. There was also "responsive reporting" where health care providers are allowed to participate in an ongoing investigation but do not initiate it. This lets law enforcement continue an investigation by requesting that alcohol intoxication be part of the medical evaluation. Thirty-one states, including Rhode Island, have statutes that allow for reporting of drivers whom physicians feel are unable to drive because of a medical problem. These laws can be mandatory or permissive; in Rhode Island this law is permissive. This medical reporting is done through an administrative mechanism to the RI Division of Motor Vehicles and does not involve law enforcement or the courts. A 2001 survey of 531 Rhode Island physicians showed support for this type of reporting. All emergency medicine physicians (180), all general surgeons (111), and a sampling of adult primary care providers (240) were surveyed. Preliminary data showed that a majority (79%) of physicians felt comfortable reporting a hypothetical very intoxicated patient (0.24% BAC) who was the driver involved in a motor vehicle crash to a medical review board of the Division of Motor Vehicles.¹⁵ Only (52%) felt comfortable reporting the same hypothetical patient to the police.

In the following essay, two members of the Rhode Island Division of Motor Vehicle, Medical Review Board describe the system in place in Rhode

. . . all patients from motor vehicle crashes [should] be screened for alcohol problems.



Island. It uses the privilege of driving as the motivator for treatment of the driver's alcohol use problem.

In summary, there continues to be a serious problem with alcohol impaired driving. Because the prevalence of alcohol use is high in those involved in motor vehicle crashes, it follows that all patients from motor vehicle crashes be screened for alcohol use problems. Those who screen positive should be offered counseling and referred to appropriate resources. Physicians should be aware of their state's laws on reporting.

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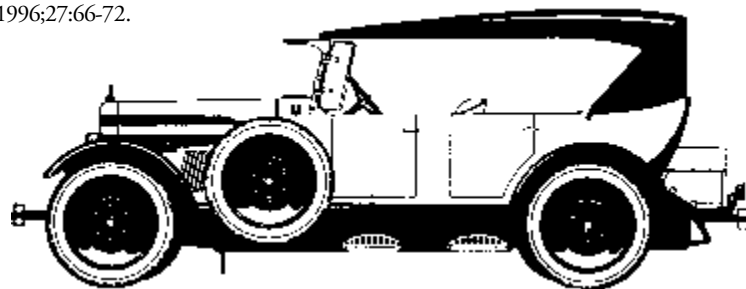
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Michael J. Mello, MD, MPH, is Director, Injury Prevention Center, and Clinical Assistant Professor of Medicine, Brown Medical School.

Ted D. Nirenberg, PhD, is Co-Director, Injury Prevention Center, and Associate Professor of Psychiatry and Human Behavior, Brown Medical School.

CORRESPONDENCE:

Michael J. Mello, MD, MPH
Injury Prevention Center
110 Lockwood Street, Suite 334
Providence, RI 02903



Impaired Drivers: A Call to Action for Rhode Island Physicians

Dawn Richardson, MD, and Daniel S. Harrop, III, MD

Many Rhode Island physicians have encountered impaired drivers in the course of their practice and wondered what they could and should do about it. Is it legal to notify the police? Can one be sued for reporting? Is it nobody's business? Why wasn't the injured drunk driver I took care of in the emergency room charged with operating under the influence by the police? What about my elderly office patient with Alzheimer Disease who insists on driving in spite of her son's concern about her safety? What can I do about it?

Physicians frequently take the lead on interventions for public health problems. There have recently been initiatives compelling them to assist in traffic safety. Five states require mandatory reporting of drunk driving, but Rhode Island physicians are not currently permitted to report impaired drivers directly to the police, even voluntarily. Luckily, a little known and under utilized Rhode Island law (31-10-44) has been in effect since the 1970s that permits voluntary reporting of impaired drivers to a medical advisory board of the Division of Motor Vehicles.

The medical advisory board meets monthly and oversees a variety of cases; (e.g., handicapped plate applications, seizure disorder), but the bulk of our time involves license reinstatement requests from Rhode Islanders with 3 or more drunk driving convictions. RI law 31-10-44 permits us latitude in creating policy with which to recommend or not recommend reinstatement of drivers licenses to the Registrar. Our goal is not to be secretive and draconian but to fairly look at the medical condition of drivers who come to our attention and recommend reinstatement under certain conditions. For example, our policy for some time has been to consider 3 drunk driving convictions as a

defining characteristic of alcoholism. We recommend reinstatement of licenses for these Rhode Islanders if they have had 1 year of continued sobriety¹, completed a course of treatment for alcoholism, and continued support such as counseling or Alcoholics Anonymous. We have had some unfortunate cases of recidivism among people who have met these guidelines and have been reinstated, but we have seen many people successfully compelled to treatment simply because they wanted their license back.

The Division of Motor Vehicles receives voluntary reports from physicians regarding impaired drivers from time to time but it is spotty. It takes time out of the busy practitioner's day to dictate a letter to the medical advisory board regarding their impaired patient. The Division of Motor Vehicles created the Physician's Statement form (Table 1) to simplify the reporting of impaired drivers. The Physician's Statement is intended to be inclusive of all medical conditions that might impair one's ability to drive safely including dementia, seizure disorder, narcolepsy and substance abuse among others.

The medical literature suggests that fewer than 1 in 5 drunk drivers taken to the emergency department are charged with drunk driving by police². Thus, a trip to the emergency department after a crash involving impaired driving is a "get out of jail free" card. I am not writing an article about the failure of police and judges to convict impaired drivers that present to the emergency department. Instead I am making a call to action to Rhode Island Physicians to take the lead and use RI law 31-10-44 and the new Physician's Statement form to intervene on the issue of impaired driving for the safety of their patients and the public. We can use the desire to drive a car to compel impaired Rhode

Islanders to seek medical treatment. Many of these conditions are reversible with treatment, and medically compliant drivers can and do get their licenses back.

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Dawn Richardson, MD, is an emergency medicine physician at St. Anne's Hospital.

Daniel S. Harrop, III, MD, is Clinical Assistant Professor of Psychiatry, Brown Medical School, and Instructor in Psychiatry, Harvard Medical School.

Both authors are members of the Medical Advisory Board of the RI Division of Motor Vehicles.

CORRESPONDENCE:

Dawn Richardson, MD
teamghastlypale@hotmail.com



PHYSICIAN'S STATEMENT

PLEASE READ THE FOLLOWING INFORMATION CAREFULLY BEFORE COMPLETING THIS FORM.

You should complete the Physician's Statement based on your examination of the patient and indicate if he or she is capable of operating a motor vehicle safely and responsibly.

▶ Complete the entire form and sign your name on the reverse side.

▶ Completing this report does not violate physician/patient privilege and when made in good faith the physician shall be immune from any civil liability that might otherwise result from making this report (R.I. STATE LAW 31-10-43)

| | |
|---|---------------------------------|
| PATIENT INFORMATION | |
| PATIENT'S NAME (LAST, FIRST, MIDDLE) _____ | DATE OF BIRTH ____/____/____ |
| PATIENT'S ADDRESS (COMPLETE) _____ _____ _____ | STATE _____ |

MEDICAL CONDITIONS

PLEASE CHECK APPROPRIATE BOXES IF THE PATIENT (DURING RECENT) HAS ANY OF THE FOLLOWING CONDITIONS THAT WOULD IMPAIR HIS OR HER ABILITY TO SAFELY OPERATE A MOTOR VEHICLE.

| | |
|---|--|
| <input type="checkbox"/> VISUAL IMPAIRMENT Should not be required to wear glasses when driving at all times | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| <input type="checkbox"/> COGNITIVE IMPAIRMENT Impaired ability to learn, reason or display judgment | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| <input type="checkbox"/> PSYCHIATRIC Impaired ability to learn, reason or display judgment | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| <input type="checkbox"/> HEARING IMPAIRMENT Should not be required to wear hearing aid at all times | Yes <input type="checkbox"/> No <input type="checkbox"/> |
| <input type="checkbox"/> ORTHOPEDIC IMPAIRMENT Should not be required to wear brace, cast or other orthopedic device at all times | Yes <input type="checkbox"/> No <input type="checkbox"/> |

| | |
|------------------------------|-------|
| VISION | |
| W. 1191 (R.I. REG. 26-26-01) | RIGHT |
| W. 1192 (R.I. REG. 26-26-02) | LEFT |
| W. 1193 (R.I. REG. 26-26-03) | RIGHT |
| W. 1194 (R.I. REG. 26-26-04) | LEFT |

| | |
|--|--|
| <input type="checkbox"/> COGNITIVE IMPAIRMENT | <input type="checkbox"/> PSYCHIATRIC |
| <input type="checkbox"/> Impaired ability to learn, reason or display judgment | <input type="checkbox"/> Impaired ability to learn, reason or display judgment |
| <input type="checkbox"/> (None) | <input type="checkbox"/> (None) |
| <input type="checkbox"/> (Specify Impairment) | <input type="checkbox"/> (Specify Impairment) |

| | |
|--|--|
| PHYSICIAN'S SIGNATURE _____ DATE ____/____/____ | PHYSICIAN'S LICENSE NUMBER _____ EXPIRES ____/____/____ |
|--|--|

| | |
|---|--|
| <input type="checkbox"/> DISORDERS THAT IMPAIR CONSCIOUSNESS | <input type="checkbox"/> MUSCULOSKELETAL CONDITIONS |
| <input type="checkbox"/> Anesthetic Effect | <input type="checkbox"/> Headaches |
| <input type="checkbox"/> Epilepsy or other partial seizures | <input type="checkbox"/> Fractures |
| <input type="checkbox"/> Low Back Severe Exacerbation | <input type="checkbox"/> Alcohol or Drug Abuse |
| <input type="checkbox"/> Back Pain | <input type="checkbox"/> Other (Please Explain) |
| <input type="checkbox"/> Other (Please Explain) | |

| | |
|---|--|
| <input type="checkbox"/> ALCOHOL OR DRUG ABUSE | <input type="checkbox"/> OTHER CONDITIONS |
| <input type="checkbox"/> Blood Alcohol Level | <input type="checkbox"/> None Reported |
| <input type="checkbox"/> Excess of Alcohol Consumed | |
| <input type="checkbox"/> Urine Test Positive | |
| <input type="checkbox"/> Other (Please Explain) | |

PLEASE ATTACH ADDITIONAL COMMENTS IF NECESSARY:

Who states that this person was driving a motor vehicle?
 Vehicle F.M.S. Self-Administered Other (Please Explain)

STATEMENT OF PHYSICIAN

Are you the patient's regular physician? Yes No

If not, how many times have you seen the patient in the last year?
 1 2 3 4 5 6 7 8 9 10 More than 10

How long has the patient been under your care?
 Less than 1 month 1 to 3 months 3 to 6 months 6 to 12 months More than 12 months

Do you have any other conditions that may affect the patient's ability to drive?
 Yes No

Do you have any other conditions that may affect the patient's ability to drive?
 Yes No

Do you have any other conditions that may affect the patient's ability to drive?
 Yes No

Table 1.

Alcohol, Marijuana, and Injury in the Emergency Department

Robert Woolard, MD, Ted D. Nirenberg, PhD, Bruce Becker, MD, Richard Longabaugh, EdD, P. Allison Minugh, PhD, Kathleen Carty, MSW, Aruna Gogineni, PhD, Patrick R. Clifford, PhD

Alcohol use is associated with injury. Although many emergency physicians advocate routine screening of all trauma cases for alcohol and drugs of abuse, most emergency physicians do not follow suit. However, some emergency physicians selectively screen injured patients for alcohol intoxication and occasionally for marijuana or other drugs of abuse.

Emergency physicians at **Rhode Island Hospital Emergency Department (RIHED)** and psychologists from the **Center for Alcohol and Addiction Studies (CAAS)** at Brown University have been investigating the links between emergency visits, injury, alcohol and other drugs for many years. In 1992, we found an alarmingly high intoxication rate among injured patients in RIHED, 21%,^{1,2} but also found that injured patients were motivated to change risk behaviors.³ Patients at risk for hazardous and problematic drinking could be easily identified in the ED.^{4,5} Finally, when these patients were counseled in the ED, they reduced **driving under the influence (DUI)** and suffered fewer injuries.^{6,7}

Addressing alcohol problems in the emergency department is becoming more routine. Several strong advocates for alcohol and substance use screening and counseling have emerged within emergency medicine.^{8,9} Our focus at RIHED has turned recently to marijuana. Marijuana is not as clearly linked to injury as alcohol use. Many physicians consider marijuana use to have few medical consequences. However, the combined effects of marijuana and alcohol may increase cognitive impairment. The effect of the two drugs when taken in combination is additive.¹⁰ Using marijuana and drinking alcohol impairs driving performance. Most states, including Rhode Island, have driving under the influence statutes that recognize impairment with a elevated **blood alcohol concentration (BAC)** > .08 mg/dl. In research studies, the combination of small

amounts of alcohol, one or two drinks, (breath or blood alcohol concentration, BAC= .04 mg/dl.) and marijuana, one cigarette or bowl, (tetrahydrocannabinol, THC at 100 g/kg) has equivalent effects to BAC > .08 mg/dl.¹¹

Both alcohol and marijuana are present in up to 10% of injured drivers¹² and 37% of injured trauma patients.¹³ Drinking alcohol is a major risk factor for injury. Marijuana use is the leading drug factor other than alcohol. Injuries with marijuana use are seen when marijuana is used in combination with alcohol.

When injured patients come to the ED, they may readily acknowledge alcohol and/or drug use and the subsequent harm. The injury may provide an opportunity for intervention, a "teachable moment." Patients who receive intervention at the ED are more likely to benefit by reducing future injuries. The **Rhode Island Early Intervention Study (REIS)**, a randomized controlled trial, demonstrated that brief intervention in the ED followed by a booster session at 7-10 days, significantly reduced alcohol-related injuries and injuries from motor vehicle crashes.⁷

While progress has been made in addressing alcohol related injury, the problem of marijuana use in combination with alcohol merits attention. Our REIS data shed some light on the interface of alcohol, marijuana and injury.

METHODS

In the REIS study, injured drinkers presenting for treatment at the Rhode Island Hospital ED completed questionnaires in the ED. The ED census averaged 69,000 patient visits per year during the study. Patients were enrolled from January 1996 through September 1998 on Thursday through Monday evenings from 8 pm to 6 am. Patients were eligible if they sought treatment for an injury that occurred within the previous seven days and did

not require hospitalization. They also had to screen positive for hazardous drinking [an **Alcohol Use Disorder Identification Test (AUDIT)** score > 8, a self-report of drinking alcohol within 6 hours prior to the injury, or a BAC test positive for alcohol].

Patients were asked about past injuries, readiness to change, and substance use. Injury was reported by patients by completing an **Injury Behaviors Checklist (IBC)**.¹⁴ The patient's readiness to change their drinking and risk behavior was measured by the Readiness to Change on a Contemplation Ladder from the work of Beiner and Abrams.¹⁵ Marijuana and substance use were determined by ascertaining drug use and the frequency of use from questions about marijuana, cocaine, hallucinogens, inhalants, amphetamines, sedatives, opiates, and steroids. Demographic variables included gender, age, socio-economic status, marital status and race. Alcohol use was measured with the **Alcohol Use Disorders Test (AUDIT)**.¹⁶ With descriptive statistics and cross-tabulation, we examined overall differences between marijuana users and non-users; with logistic regression analysis, we assessed the likelihood of injury.

RESULTS

Of 578 injured drinkers who participated, 500 answered the drug use questionnaire in the study. The prevalence of marijuana use among injured drinkers was 48%. Forty percent of the subjects used alcohol alone; 29% of subjects used alcohol, marijuana and other drugs; 25% used alcohol, marijuana and no other drugs. Only 5% of subjects used alcohol and another drug without marijuana use. Most patients who used other drugs used marijuana more often than any other drugs.

Marijuana users were younger, male, single, and less educated. Employment status, student status, and

race were not significantly different. Marijuana users had higher AUDIT scores and higher risk-taking/impulsivity scores. They had more injuries in the past year than non-users (90% versus 73% respectively). Marijuana users had more doctor-treated injuries, injuries from motor vehicle crashes, assaults, sports injuries, and other injuries than non users. Marijuana users and non-users had the same readiness to change drinking and risk behaviors (71% vs. 65% respectively).

Because marijuana users differ from non-users on a number of characteristics that influence their risk of injury, multivariate analyses were used to identify independent predictors of injury. Marijuana use was an independent predictor of prior alcohol-related injuries and motor vehicle crash injuries. Marijuana users were 2.19 times more likely to have experienced previous alcohol-related injuries than non-users and 1.74 times more likely to have experienced a prior motor vehicle injury. Marijuana use was not an independent predictor of total injuries, doctor treated injuries, assaults, sports injuries or other injuries. Other factors were independent predictors of injuries such as: higher risk taking scores, young age, male gender, and higher AUDIT scores.

DISCUSSION

In our ED almost half of injured drinkers reported using marijuana in the months prior to the ED visit. Injured drinkers who used marijuana reported more injuries. The association of marijuana use, more risk-taking and more hazardous alcohol use suggests a pattern of behaviors leading to injury. More risk-taking may lead to more injury. Alcohol and marijuana use in association with other risk activities may be part of the cause of these injuries.

A survey of the general population reports that 5% of adults used marijuana in the last month.¹⁷ In our ED, we found a much higher proportion of injured drinkers using marijuana. There remains controversy about the association of marijuana with injury. Most investigators have examined the effects of marijuana alone and have not

found marijuana when used alone to contribute to injury.¹⁸ However, in highway fatalities, there is evidence that marijuana is the secondary factor (after alcohol) causing lethal injuries.³ Our study supports findings which implicate marijuana as the second drug factor often combined with alcohol intoxication as a cause of injury.

The prudent emergency physician treating injured drinkers in the ED should expect marijuana use.



The prudent emergency physician treating injured drinkers in the ED should expect marijuana use. Injured drinkers who use marijuana report that they are as ready to change drinking and risk behaviors as those who do not use marijuana. Although there is concern about lack of motivation among marijuana users, our results indicate that marijuana users are as ready to change and may be as receptive to counseling as other patients in the ED. The risk of subsequent injury and the prevalence of marijuana use suggest that brief interventions to reduce injury should target marijuana as well as alcohol.

EDs serve as a source of care for a substantial proportion of injured persons. This study suggests that many injured drinkers also use marijuana. These patients receive little preventive counseling in the ED currently. They are at risk for future injury. Given the magnitude of the problem and the opportunity, prevention of alcohol and marijuana related injuries should be integrated into ED care.

CONCLUSION

Marijuana use is prevalent among injured drinkers in the ED. Almost half of injured drinkers report marijuana use in the recent past. Marijuana-using injured drinkers are as ready to change their alcohol and risk behaviors as non-users. Emergency physicians should

consider screening injured patients for both alcohol and marijuana. A positive alcohol test should lead to suspicion of marijuana use, as well.

An intervention to prevent injury by addressing use of both substances should be developed. In our REIS study, brief ED intervention followed by a booster session reduced alcohol-related injuries but not total injuries. The alcohol-focused (REIS) intervention should be broadened to include marijuana.⁷ The merit, utility, and feasibility of this and other ED-based injury reduction interventions will be examined in future studies at RIHED in collaboration with CAAS, with the support of the Injury Prevention Center.

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Robert Woolard, MD, is Associate Professor of Medicine, Brown Medical School.

Ted D. Nirenberg, PhD, is Associate Professor of Psychiatry and Human Behavior, Brown Medical School.

Bruce Becker, MD, is Associate Professor of Community Health, Brown Medical School.

Richard Longabaugh, EdD, is Professor of Psychiatry and Human Behavior, Brown Medical School.

P. Allison Minugh, PhD, is Adjunct Assistant Professor of Psychology and Human Behavior, Brown Medical School.

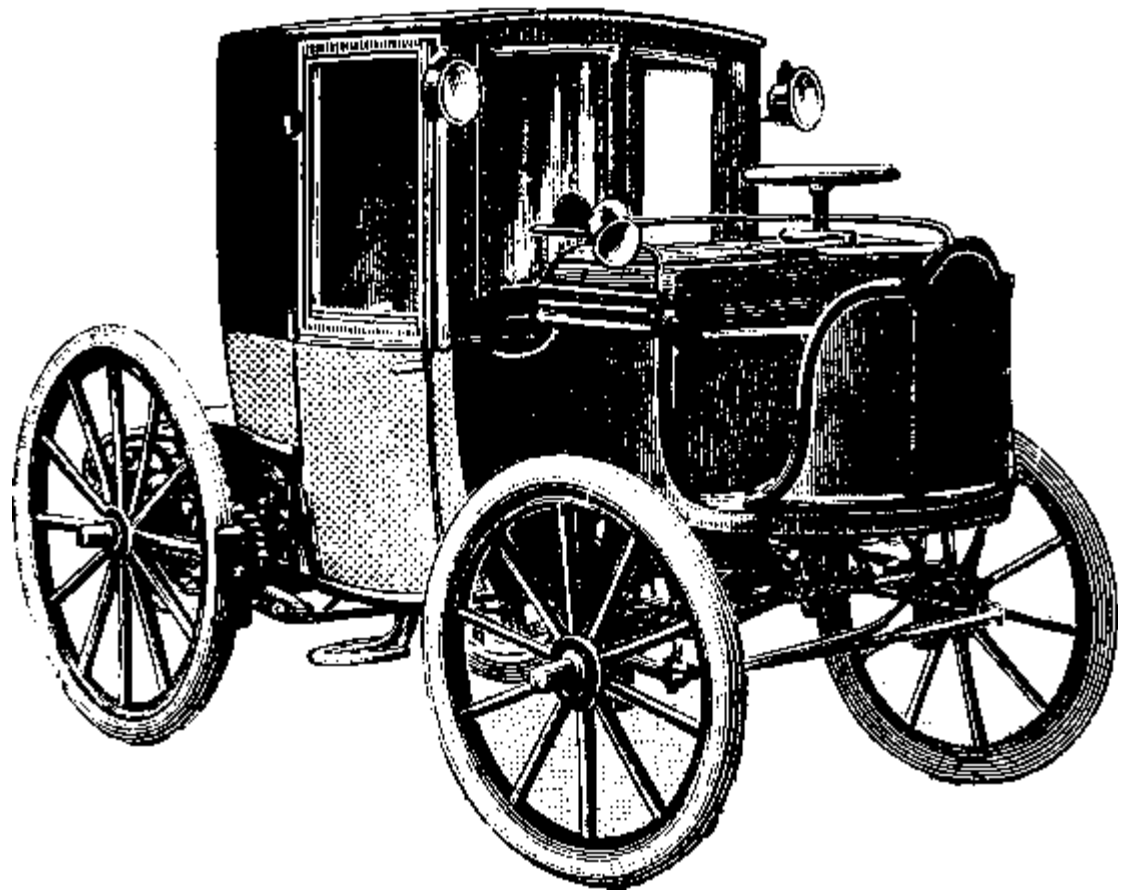
Kathleen Carty, MSW, who was a Clinical Research and Assessment Coordinator at Rhode Island Hospital, is a doctoral student at Boston College.

Aruna Gogineni, PhD, is Assistant Professor of Psychiatry and Human Behavior, Brown Medical School.

Patrick R. Clifford, PhD, is Associate Professor, New York University School of Education, Department of Health Studies.

CORRESPONDENCE:

Robert Woolard, MD
Rhode Island Hospital
Department of Emergency Medicine
Providence, RI 02903
phone: (401) 444-5141
fax: (401) 444-4307
e-mail: Rwoolard@lifespan.org



Firearm Injury Surveillance in Rhode Island

Amy Rosenthal, MPA, MPH, Michael J. Mello, MD, MPH, Maria Rangel, MPH

In 1999, there were 28,874 firearm deaths in the United States; more than 16,500 were suicides and 10,800 were homicides.¹ These staggering statistics grossly underestimate the magnitude of the firearm epidemic. A 1995 article in the *Journal of the American Medical Association* estimated that the number of firearm injuries is three times larger.² However, without a comprehensive national surveillance system, this information is difficult to confirm. To define the scope of firearm injuries and determine preventive steps, policy makers, public health professionals and the public must first understand the magnitude of the problem. This understanding can best occur through the collection of sound data, which can best be done through the systematic and coordinated collection of comprehensive firearm death and injury data via a firearm injury surveillance system.

FIREARM DATA ABOUT RHODE ISLAND PRESENTLY AVAILABLE

Data on firearm-related deaths in Rhode Island are available from the **Centers for Disease Control and Prevention (CDC)**. Between 1989 and 1998, there were an average of 54 deaths per year within the state due to firearms.³ The average rate of deaths is 5.2 per 100,000.⁴ Unfortunately, comparable morbidity data are not available within the state.

The most complete and accurate way to collect firearm-related data in Rhode Island is to use all of the information collected by different agencies and organizations to create a comprehensive firearm surveillance system. Rhode Island data are collected independently by a variety of agencies, including police departments; the Bureau of Alcohol, Tobacco, and Firearms; RI Department of Health; hospitals and trauma registries; the medical examiner; and the state crime lab. The data collected by some of these agencies provide an incomplete picture of firearm deaths and injuries in Rhode

Island. Linking this information gives a clearer picture.

DEFINING A COMPREHENSIVE FIREARM SURVEILLANCE SYSTEM

Surveillance can be defined as the on-going, systematic collection, analysis, and interpretation of outcome-specific data essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those who need to know.⁵

A comprehensive firearm surveillance system would link data on firearms from a variety of different sources, which may include:

- Hospital data (both inpatient and outpatient)
- Police reports
- Medical Examiner reports and death certificates
- Crime lab data
- Bureau of Alcohol, Tobacco and Firearms traces on firearms used in crimes

Existing firearm surveillance systems in other states utilize a different combination of the data depending on what is available and collected. To our knowledge, no system uses all five of these data sources to collect complete firearm death and injury data.

PREVIOUS AND ONGOING FIREARM SURVEILLANCE INITIATIVES

In 1999, the Harvard Injury Control and Research Center launched the **National Violent Death Reporting System (NVDRS)**. With funding from several major private foundations, NVDRS was created to support local firearm data-gathering efforts and to build a model national reporting system. Currently, the federal government supports **Fatality Analysis Reporting System (FARS)**, which provides extensive information on motor vehicle related crashes in an effort to inform policy-making.⁶ NVDRS models its

work after FARS and provides the same resources to researchers and policy makers interested in studying firearm death and injury.

In 2000, the Injury Prevention Center at Rhode Island Hospital, Hasbro Children's Hospital and The Miriam Hospital collaborated with Harvard researchers to conduct a limited retrospective analysis of firearm deaths and injuries treated at Rhode Island Hospital and Hasbro Children's Hospital. The results showed that 200 patients were treated between 1998 and 1999 for firearm-related injuries.

DATA TO BE COLLECTED IN RHODE ISLAND

Firearm death and injury data that could be collected in Rhode Island can be divided into four broad categories: data on the victim; on the perpetrator, on the firearm and on general logistical information. Within each of the four broad categories, a number of variables could be collected. These include:

Victim

Sex, race, ethnicity, age, type of injury (homicide, suicide, unintended, undetermined, occupational, etc.), marital status, education, occupation, location of the wounds, toxicology reports, number of bullets penetrating body, relationship with perpetrator, signs of violence, address or zip code, and activity.

Perpetrator

Sex, race, ethnicity, age, marital status, education, occupation, toxicology reports, relationship with victim, signs of violence, probation, parole, final disposition, address or zip code, and activity.

Firearm

Type of the firearm, weapons, weapon recovered, specs of the firearm, owner of firearm (if known), bullets recovered, and bullets information.

General information

Location of the incident, county, police agency, incident number, circumstances of injury, crime lab number, location prior to injury, circumstances prior to injury, case found by, pronounced by, and other significant conditions.

It is critical to understand that a firearm surveillance system would in no way provide confidential information about any individual to the public. Confidential information would be collected initially in order to link data sources together and prevent redundancy. However, all confidential data would be expunged from the system. This is standard practice for data linkage systems. In addition, it is also expected that some data as a whole will be inaccessible and other incident-specific data may be missing in many of the individual cases.

The challenge would be to link the data by cases, thereby retrieving data from a variety of sources and compiling it incident by incident. Descriptive analyses would need to be performed with the hope of determining the characteristics of each firearm death and injury in Rhode Island. Analysis of the variables would correlate characteristics of the victim, perpetrator, firearm, and circumstances surrounding the event.

General characteristics of the firearm injury problem would be able to be reported. Even more importantly, these findings could provide critical information that could aid in the development of prevention programs and policies aimed at reducing gun death and injury.

RHODE ISLAND PROVIDES A UNIQUE OPPORTUNITY FOR FIREARM SURVEILLANCE

Several circumstances make Rhode Island an ideal state for creating such a system.

First, a surveillance system of this type would be more manageable in Rhode Island than in other states due to its small geographic size and its population of approximately one million people.

Second, Rhode Island Hospital (RIH), the state's only Level I Trauma Center, which sees most of the serious

... a firearm surveillance system would in no way provide confidential information about any individual to the public.



gunshot wound cases, E codes all of its outpatient and inpatient cases. E codes, a supplementary classification system used in the World Health Organization's International Classification of Diseases, are used to code morbidity data by describing the manner, mechanism and location of the injury. For example, an E code can indicate whether an injury was unintentional or from an assault, caused by a firearm or a motor vehicle crash, and took place in a home or on a farm. As a result, much of the data regarding firearm deaths and injuries are being documented (in many states this does not occur). The data could then be compiled and linked to other data sources.

Third, the Providence Police Department typically traces all firearms used in crimes with the Bureau of Alcohol, Tobacco and Firearms. It would be relatively manageable to trace guns used in crimes outside the city of Providence. The data could then be linked to other data sources.

Fourth, the state has only one Medical Examiner and one Crime Lab, thereby reducing the organizations to coordinate.

CONCLUSION

The creation of a prospective, comprehensive firearm surveillance system in Rhode Island would provide critical data to those who want to better understand the firearm death and injury problem in this state. The state is well situated to create such a system because so much of the data is presently collected. The process of linking the data, which could be successfully managed by a small staff, could provide a large amount

of critical data to the entire state, allowing policymakers to have the information necessary for informed public policy.

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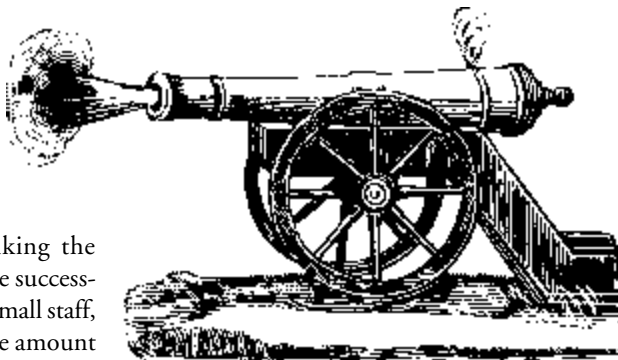
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Amy Rosenthal, MPA, MPH, is the former Associate Director, Injury Prevention Center.

Michael J. Mello, MD, MPH, is Director, Injury Prevention Center, and Clinical Assistant Professor of Medicine, Brown Medical School.

CORRESPONDENCE:

Michael J. Mello, MD, MPH
Injury Prevention Center
110 Lockwood Street, Suite 334
Providence, RI 02903
e-mail: mjmello@lifespan.org



Injuries in Rhode Island Elders

Robert A. Partridge, MD, MPH

The number of older adults in the United States is growing, and their rate of injuries increasing commensurately. Approximately one third of emergency department visits nationally are related to intentional or unintentional injury; of these, about 10% involve individuals over the age of 65 years.¹ In Rhode Island, demographics make these numbers particularly important. While persons aged 65 years or older comprise 12.4% of the overall U.S. population, in Rhode Island this figure is 14.5%. Rhode Island ranks sixth among the 50 states in the percentage of elders in its population.²

Injuries are a major public health problem for elder Rhode Islanders. Between 1966 and 1988, unintentional injuries were the seventh leading cause of death and suicide was the ninth leading cause of death for Rhode Islanders over the age of 65. Injuries are also a significant cause of disability and poorer quality of life for this population. The economic impact of these injuries comes to billions of dollars annually.^{3,4} In older adults, the most common mechanisms of injury are falls, motor vehicle related trauma (occupants and pedestrians), suicides, and assaults (including elder abuse). Less common causes include burns, poisonings, drownings and suffocations. This article focuses on the most common mechanisms of injury in elder Rhode Islanders and discusses the types of injuries sustained, injury prevention techniques that can be applied specifically to this population, the role of health care practitioners in reducing the burden of injury in this population, and recent research into the problem of injury in older Rhode Islanders.

FALLS

Approximately 1 in 3 older adults falls each year, and falls are the leading cause of injury death in elders.^{5,6,7} Falls, usually at home, are also the most common cause of injuries and hospital admissions due to trauma in this

age group. Hip fractures, which commonly result from falls in elders, cause significant mortality and disability in elders. Women are most at risk, sustaining 75-80% of all hip fractures.⁸ In addition, the "old old"—those over age 85—are 10-15 times more likely to have a hip fracture after a fall than are persons aged 60-65.⁹ Approximately 50% of older adults hospitalized for a hip fracture cannot return home or function independently after this type of injury.^{10,11} The economic burden of hip fractures in the elder population approaches \$3 billion annually.¹²

Host factors that increase the likelihood of a fall in an older person include gait and balance disturbances, neurological and musculoskeletal disabilities, psychoactive medications, dementia and visual impairment.¹³ Environmental hazards, such as slippery surfaces, uneven floors, poor lighting, loose rugs, unstable furniture and objects lying on floors, also play a role.⁵

Preventing fall injuries and reducing morbidity and mortality in elders who fall is possible through behavioral and environmental change, as well as through intervention by physicians and other health care providers. Elders who exercise regularly improve their strength, balance and coordination, which has been shown to reduce the likelihood of a fall.^{12,13} Making living areas safer is also effective. Useful measures include removing tripping hazards, installing handrails on both sides of staircases, and installing no-slip bath mats and handrails on the sides of the bathtub or shower.¹⁴

Physicians have a role to play in preventing injuries from falls in elders. Physicians can identify elder patients who are at risk for falling and initiate a home safety evaluation through nursing or social services agencies. Physicians are also best able to identify those patients who have impaired strength, balance or coordination. In addition, physicians can review all an elder

patient's medicines to reduce side effects and interactions that could increase fall risk.¹⁵ Referral for regular ophthalmologic evaluations is also important, because impaired vision increases fall risk.¹¹ Other strategies involve safety products that may reduce the risk of a severe injury even if a fall cannot be prevented; e.g., protective hip pads in clothing and impact-absorbing floor materials.

MOTOR VEHICLE AND PEDESTRIAN INJURIES

Elder adults are at risk for motor vehicle related injury, both as occupants of vehicles and as pedestrians. In 1998, 7,269 people in the United States over age 65 died as a result of motor vehicle related trauma. Of these, 83% were occupants and 16% were pedestrians.¹⁶ Injuries and deaths from motor vehicle related trauma are rising as the percentage of elders in the population increases. After the under-25 age group, motor vehicle related death rates (per 100,000) are higher for those 75 years of age or older than for any other age group; per mile driven, drivers over age 75 have higher rates of fatal motor vehicle crashes than any other group except teenagers.¹⁶ In Rhode Island, however, the motor vehicle related death rate for persons aged 75 years and older is the lowest in the nation, at 8.9 deaths per 100,000.¹⁷

Although pedestrian injuries form a small proportion of motor vehicle injuries and deaths, these injuries are a significant risk for the elderly. In 1998, adults aged 70 and older represented only 9% of the population but accounted for 18% of all pedestrian fatalities. This population also had the highest death rate of any age group.¹⁸ The one bright spot in pedestrian statistics is that the number of nonfatal injuries among elder pedestrians injured by motor vehicles declined during the 1990s, in contrast to nonfatal injuries in elder car occupants, which increased.¹⁷

Motor vehicle crash-related injuries in the elder population are important because the number of older drivers is increasing. In the past decade, the number of licensed drivers over the age of 70 has increased by nearly 50% - a trend likely to continue as the US population ages.¹⁹ In addition, older people who are injured in a motor vehicle crash are more likely to die of their injuries than younger people. However, as a group, elders have demonstrated behaviors that tend to reduce their risk of injury: they have very high seatbelt usage rates, drive when conditions are safest and are less likely to drink and drive.²⁰⁻²²

Seatbelt use, injury patterns, and outcomes have been studied specifically in older Rhode Islanders. Rhode Island elders have high seatbelt use rates. Research on older Rhode Islanders has also shown that seatbelt non-compliance is associated with a higher risk of death, higher emergency department charges and increased diagnostic imaging utilization. Patterns of injuries sustained in a crash have been shown to be different than those of the general population, with injury patterns showing a relationship to whether a seatbelt was used at the time of the crash.²³

Injury prevention for elder motor vehicle occupants and pedestrians can be achieved through engineering advances (automobile design, road design), encouraging use of alternative means of transportation, and restricting driving privileges when appropriate (e.g. time of day, geographic location or road type). Physicians can help reduce the risk of elder injuries from motor vehicle crashes by ensuring that elders have regular vision and hearing exams, and by reporting to state licensing agencies (when permissible by law) any persons with medical conditions that may impair safe driving. Physicians can also encourage elders to walk whenever possible, citing as reasons not only a reduced risk of car injury but also the chance to improve physical health, protect the environment and reduce the number of cars on the road.

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NEW RESEARCH

Research on injuries and injury prevention in Rhode Island elders is ongoing. Because Rhode Island has a large, active elder population, it is an ideal setting in which to study injuries and to develop and implement injury prevention strategies directed toward this population.

A prospective study of injured elder emergency department patients demonstrated that patients with minor injury had differences in cognitive processing efficiency compared with age-matched controls. These differences were rapidly assessed at the bedside using computerized tests of cognition. The tool used to assess cognition, the **Automated Neuropsychological Assessment Metrics (ANAM)**, provided information about patients' speed of cognition that is not assessed by the Modified Mini Mental Status Exam. Although this study did not establish a clear cause and effect relationship between cognitive processing and injury, it is likely that such a relationship exists. It is possible that this and further injury prevention research will allow simple computerized tests of cognition to identify elder patients at risk for injury.²⁴

Recent research has found that independent, active elder emergency department patients are at risk for short term functional decline after minor injury. It was previously known that elders were likely to have a decline in functional status after a major injury, and it now appears that a minor injury requiring an emergency department visit but not hospital admission also puts highly functioning elder patients at risk for functional decline. In this study, elder patients with minor injury (usually contusions, lacerations, fractures and sprains) were functionally

assessed at the time of injury and again at 3-month follow up using the **Activities of Daily Living (ADL)** and **Independent Activities of Daily Living (IADL)** Scores. More than 6% of patients had a decline in ADL scores and over 22% had a decline in IADL scores 3 months after minor injury. A decline in ADL was related to injury type, while a decline in IADL was related to anatomic location. The importance of this study for physicians is that elders with any injury are at risk of functional decline, even if the injury is apparently minor. For the independently functioning elder population, this may have the negative consequence of a loss of independence. Emergency and other physicians who care for elders with minor injury should consider initiating follow-up evaluation and possible intervention in highly functioning elders after acute injury.²⁵ Note, of course, that the minor injury may signal the beginning of a disease, not the cause.

Other investigations involving injury in elder Rhode Islanders have been initiated. A study of elder motor vehicle crash victims to determine injury patterns, mortality, hospital costs and clinical outcome with respect to seatbelt compliance has been completed. In addition, the smoking and alcohol consumption habits of elder patients and their relationship to injury are also under investigation. Data from these studies will assist physicians and public health professionals both in identifying elders who may be at risk for injury and in treating and managing injured elder patients.

CONCLUSION

Elder persons comprise a significant proportion of the Rhode Island population, and the total number of elders in Rhode Island is likely to rise over the next several decades. Elders are significantly at risk for fall-related injuries, motor vehicle crash and pedestrian trauma, as well as suicide and injuries resulting from violence. Physicians and other health care providers should take a leadership role in the effort to reduce the burden of injury in this population.

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Robert A. Partridge, MD, MPH, is Assistant Professor of Medicine (Emergency Medicine), Brown Medical School.

CORRESPONDENCE:

Robert A. Partridge, MD, MPH
 Department of Emergency Medicine / Samuels 2
 Rhode Island Hospital
 593 Eddy Street
 Providence, RI 02903
 phone: (401) 444-6653
 fax: (401) 444-6662
 e-mail:
 Robert_Partridge_MD@brown.edu



The Providence Safe Communities Partnership

Anjali Talwalkar, MD, and Sandra DelSesto, MEd

With a population of nearly 50,000, the Enterprise Community in Providence - the neighborhoods of Smith Hill, Olneyville and the Southside - has the pervasive poverty and unemployment typical of most urban areas. Additionally, it encompasses a combination of cultures (African-American, Hispanic, Southeast Asian, Haitian and African) in a geographically small area.¹ Gangs and drugs, often the foci of the media, are of course serious problems, but data from the hospitals serving Enterprise Community residents pinpointed traffic-related injuries as a leading cause of death and injury in this metropolitan area.² To address this problem, in 1996 the **Providence Safe Communities Partnership (PSCP)** was formed and received a \$400,000 grant from the National Highway Traffic Safety Administration to reduce traffic injuries in the Enterprise Community.

TRAFFIC SAFETY - AN URBAN PRIORITY?

Focus groups reported that traffic safety was not a priority for residents. To reach this population, the Partnership first had to garner the support of community leaders. The collection of the injury data documenting the extent of the traffic safety problem in Enterprise Community neighborhoods was instrumental in convincing community leaders of the severity of the problem. The focus groups and key informant interviews demonstrated how residents' lack of knowledge, attitudes and risky behaviors contributed to the problem.³ To further secure community involvement, a governing PSCP Coordinating Committee was assembled, with appointees from the Rhode Island Governor's Office on Highway Safety; the Mayor's Office; Lifespan Community Health Institute; the Marriott Corporation; the Providence Plan; the Rhode Island Department of Health; and Providence Fire, School, and Police Departments. With the validation of important community groups, the Partnership could reach out

to community residents to make traffic safety a priority in their lives.

RAISING INJURY PREVENTION AWARENESS

PEDS: The Policy and Intervention for Day Care Safety (PEDS) project evolved from observation data and focus group reports. Observational data showed that usage rates of child safety seats were lower and misuse rates higher in Rhode Island than nationally. The PSCP focus groups reported that child safety seats were most frequently not used when parents either did not own a car or were passengers with their children in a car other than their own. Many parents did not move their child's safety seat into another person's car. Furthermore, most who reported owning seats admitted that they had not read the installation directions, thereby causing the Partnership to question whether the seats were properly installed.

The PEDS project aimed to increase the use of seat belts by adults and child safety seats by children ages 0-4. The target group consisted of the families of the children enrolled in eight day care centers in the Enterprise Community. The centers were split into an intervention group and a control group. The intervention group received policy development assistance and education for parents, staff and children, while the control group received no initial interventions. (After the evaluation was complete, they received the interventions.) A consultant in curriculum development created a model curriculum and an accompanying staff-training module. The curriculum involves parental participation and activities for the children. It is easily taught by day care staff and fits well into existing pre-school programs.

It soon became evident that most parents did not own child safety seats. Fortunately, funding for the purchase of child safety seats became available to the PSCP through the RI Department of Transportation. Low-income parents participating in the PEDS program were

offered free seats and installation of the seats by NHTSA-certified technicians. Usage of child safety seats increased.⁴ Several centers that had opted not to participate in the program did after observing the program's operation. Traffic safety had become part of their centers' agenda, whereas before, it was not.

Boost Me Up: The Partnership received an additional NHTSA grant to compare interventions designed to increase use of booster seats for children ages 5-8. The target group included approximately 750 families of the children enrolled in twenty day-care sites in the Enterprise Community. The centers were assigned to one of three intervention groups or a control group. All three intervention groups received free booster seats for their families, "Boost Me Up" reminder signs for their parking lots and education for day care staff and parents on traffic safety. One group received nothing else, while two other groups were guided in updating their policies to explicitly urge parental compliance with Rhode Island's child safety seat laws. Finally, parents in one of these latter groups also received financial incentives when observed using their booster seats. Due to a lack of resources, no posttest observations were done in the control group. However, observed booster seat usage increased from 0% before the intervention to 50% following it in all three intervention conditions, suggesting that the effective piece of the program was the provision of free booster seats and education.⁵

Car Seats In Clinics: Another child safety seat program run by the Partnership identifies clients through two different avenues. First, healthcare workers at five neighborhood health centers plus the clinics of Women & Infants and Hasbro Children's Hospitals identify families in financial need with children who are not properly restrained. Second, the Providence Police Department identifies vehicles with unrestrained child

passengers and offers the driver the option of participating in the Car Seats in Clinics program in lieu of paying the fine mandated by the RI Child Passenger Restraint Law. Today the program, operating from the RI Hospital campus, serves approximately 20 families per week, providing free safety seats for every child younger than eight years of age. Parents receive one-on-one instruction and installation by NHTSA-certified child safety seat technicians. Approximately 850 child safety seats have been distributed to families each year since its inception.

Safety Day: Early in its second year, the Partnership envisioned a large-scale intervention to mobilize the entire community around injury prevention. Safety Day was created as an annual, outdoor neighborhood fair held within the Enterprise Community in early summer. The goal was to attract residents and increase their injury prevention awareness through a series of informational stations and prize incentives. Over 30 city, state and community agencies, along with local businesses, participated, and over 1,000 Providence adults and children attended the festival. Over 25 interactive booths taught children and their parents about injury prevention in areas ranging from bike and pedestrian safety, gun safety, fire safety and first aid. Raffle prizes and entertainment by local groups and a popular radio station capped the event. Safety Day has evolved into the signature event of the Partnership, growing each year.

Middle School Poster Contest: During year two, the PSCP created a traffic safety poster contest to engage the Providence School Department in injury prevention. With a large audience of young people, the contest was designed to raise their awareness of safety belt and child safety seat use and bicycle helmet use. Staff met with middle school classes and their art teachers to discuss traffic safety and introduce the contest. In the first year, about half of the middle schools in the city participated; in the second year, all middle schools chose to participate. Also in year two, an insurance agency replicated the posters for distri-

bution. The grand prize-winning poster was displayed on a billboard in the community. Both school and citywide winners received prizes at a press conference at City Hall with Mayor Cianci. As the poster contest enters its third year, it has expanded to the parochial school children of Providence.

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Bringing Safety Home: This ongoing intervention seeks to provide safety information and equipment to the neediest families in Providence. An interactive injury prevention curriculum was developed to train 50 caseworkers from Family Services who, in turn, are educating 300 high-risk families. The topics covered represent the top causes of injury in Providence: motor vehicle safety, bike and pedestrian safety, poison safety, fire safety, and choking/suffocation/strangulation prevention and treatment. In addition, PSCP ensured that all Family Services staff who transport children had the proper seats installed in their vehicles.

Buckle Up Faithfully: The next point-of-entry the Partnership will target is faith-based organizations. Outreach will be conducted through religious groups in an effort to increase their safety belt usage rates.

CONCLUSION

Only when a community owns a problem can true attitude and behavior changes occur. Many residents of the Enterprise Community in Providence were not using seat belts and child safety seats, for a variety of reasons, including lack of information, low literacy, conflicting cultural norms, higher priorities such as poverty and violence, and limited English proficiency. The success of

the Providence Safe Communities Partnership is the result of multiple factors including strong local and state agency support, host institution's (Lifespan) support, research evaluation, constant nurturing of community ties, a strong Coordinating Committee and the persistence of project staff. The Partnership had to integrate injury prevention into the community's existing health and safety agenda rather than compete with it.

The PSCP has become the premiere vehicle for reaching the Enterprise Community with respect to injury prevention. Through community outreach, it is making Providence a safer community.

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Anjali Talwalkar, MD, is Project Coordinator, Providence Safe Communities Partnership.

Sandra DelSesto, MEd, is Executive Director, Initiatives for Human Development; and Project Director, Providence Safe Communities Partnership.

CORRESPONDENCE:

Sandra DelSesto, MD
110 Lockwood Street, Suite 334
Providence, RI 02903
phone: (401) 444-8403
fax: (401) 444-2249
e-mail: Spdelsesto@aol.com

High Fidelity Medical Simulation: A New Paradigm in Medical Education

Marc J. Shapiro, MD, and Walter Simmons, MD

The rapid rate of information growth, increased demands on physician educators, and patient safety concerns have created a challenge to the present model of hands-on training for medical students and physicians. Traditional on-the-job training involves learning on patients, which can be at odds with safe high quality patient care. Simulation technologies, like simple manikins, animal and organ models, cadavers, simulated patients, PC-based software and task trainers are presently used, but the full potential of technology for medical education has not been realized.¹ The use of realistic high fidelity interactive patient simulators was pioneered in anesthesia,²⁻⁴ but has only recently come into more widespread use by other specialties and some medical schools. High fidelity medical simulation offers numerous benefits for patients, trainees, educators, and is likely to become an integral tool in future medical education.⁵ Simulation training is well-established in other complex, high-risk industries, such as aviation, nuclear power, and the military. These industries provide a benchmark safety record for medicine to emulate.⁶

The 1999 **Institute of Medicine (IOM)** report, "To Err is Human," brought national attention to medical error and specifically recommended the use of simulation to support human factors training.⁷ A simulated patient care experience is an idea that has been adapted from the airline industry and flight simulators that have been used in pilot training for more than 50 years. Aviation has provided clear evidence for the contribution of individual and team errors to the occurrence of crashes and near misses.⁸ As a result of these studies, **Crew Resource Management (CRM)** curriculum for team training, supported by realistic flight simulators, is an annual mandatory training standard in the aviation industry. This pioneering work served as a model for the **Anesthesia Crisis Resource Management (ACRM)** course, one of the first applica-

tions of high fidelity medical simulation in medicine.^{3,9}

Locally, Rhode Island Hospital and Hasbro Children's Hospital have been funded participants in a Department of Defense project, "MedTeams," to transfer CRM lessons learned in army aviation to teams in the Emergency Department.¹⁰ This multi-center military and civilian project demonstrated the benefits of a teamwork training curriculum in emergency medicine. The validation study demonstrated significant improvement in quality of team behaviors between experimental and control groups following training. Clinical error rate decreased from 30.9% to 4.4% in the experimental group, ED staff attitudes towards teamwork increased and staff assessments of institutional support showed a significant increase.¹¹ Similar to the aviation experience with CRM, sustaining improved performance requires ongoing training, and this concept has led to the development of high fidelity medical simulation at Rhode Island Hospital. With support from Rhode Island Hospital, The Champlin Foundation, and the "MedTeams" project, the Rhode Island Hospital Medical Simulation Center began operation in May 2002.

This 3000+ square foot facility is composed of an office suite, conference room for audio-visual debriefings, storage and equipment rooms, two trainee simulation viewing areas, simulation control room and simulator room. The main simulation room is greater than 1200 square feet and provides the ability to simulate an actual emergency department. However, the simulation area was designed to be flexible to accommodate two separate simultaneous simulations, re-create other patient care areas (operating room, intensive care unit, radiology suite etc.), or field hospital for disaster drills. The center can support five computerized high fidelity mannequins. All aspects of actual treatment areas includ-

ing medical gases, resuscitation equipment, operating room lights, and computer capabilities have been incorporated into the design. The audiovisual system consists of digital video recording, using multiple camera angles. Video monitors in viewing rooms display patient data; wireless microphones system permit communication and individual participant recording. Audio visual editing enables staff to create educational materials.

Medical simulation technology allows for realistic clinical scenarios using life-sized computerized patient mannequins that are able to respond in real-time to a variety of pharmacological agents and clinical interventions. This type of technology offers medical educators a new way to control situational learning.¹² The computer-driven mannequins range from \$30,000 to \$200,000 and are capable of verbal communication, accurate representation of common physical exam findings (pupillary reaction, advanced airway problems, lung and cardiac sounds, pulses etc), and physiologic response to drug and treatment interventions. Treatment options can even include a multitude of invasive procedures, including cricothyroidotomy, tube thoracostomy, foley catheterization, and intravenous line placement. Realistic representations of actual treatment settings allow simulation participants to suspend disbelief and immerse themselves in the training exercise. Participants involved in the simulation may include physicians, nurses, allied healthcare personnel or multidisciplinary teams. Teams or individuals alternate viewing and participating in single or multiple patient scenarios, which are followed by a video-based debriefing to facilitate discussion, reflect on performance and highlight educational objectives.

Medical students give high ratings to stimulation-based techniques.^{13,14} It is also proposed that long-term retention of knowledge is enhanced.¹⁵ This has led

to greater interest in studying the validity and reliability of simulator-based performance assessments.¹⁶ Additionally, scenarios can be standardized and graded for comparisons across practitioners allowing for performance to be measured objectively.¹⁷

The applications for simulation in medicine are expanding as research shows promise for this training tool. It allows for an enactment or reproduction of comparable real-life situations that entails no risk to patients and perhaps will enhance patient safety by improving performance prior to actual patient encounters.⁵ In addition, educators can ensure a reproducible curriculum for all trainees, which does not depend on random encounters, and conduct this training in a setting which minimizes the time constraints in the clinical environment. Simulation can be employed to improve basic clinical and psychomotor skills, such as airway management, but may also have a role in reducing medical error through improved teamwork. In addition, scenarios can be created to allow medical professionals exposure to error-producing conditions or to experience less common clinical situations, which require additional training.

Presently, specialties as diverse as emergency medicine, surgery, trauma, pediatrics and gastroenterology are developing simulation-based training programs.¹⁸ Emergency medicine has conducted preliminary work to demonstrate the potential use of high fidelity medical simulation for teamwork training.¹⁹ Trauma team performance may also be assessed in a reproducible fashion using simulation.²⁰ Simulation devices for ultrasound, endoscopy, and surgery (wound closure, bowel anastomosis, laparotomy etc) are available. Virtual reality is becoming possible, and the combination of this technology with tactile stimuli (haptics) holds unlimited possibility in the future.

Medical science and the application of technology for patient care have advanced at a greater rate than innovations in medical education. The limitations of traditional medical education, along with the availability of new and more affordable simulation technology coupled with a national patient safety

The use of realistic high fidelity interactive patient simulators was pioneered in anesthesia, but has only recently come into more widespread use...



agenda have fueled the enthusiasm for adopting simulation as a new model for medical training and evaluation.

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Marc J. Shapiro, MD, is Director, Rhode Island Hospital Medical Simulation Center, Attending Physician in the Rhode Island Hospital Department of Emergency Medicine, and Assistant Professor of Medicine, Brown Medical School.

Walter Simmons, MD, completed a Research Fellowship in Patient Safety at Rhode Island Hospital and is Assistant Director of the Landmark tal Emergency Department.

CORRESPONDENCE:

Marc J. Shapiro, MD
Rhode Island Hospital
Medical Simulation Center
1 Hoppin Street, Suite 106
Providence, RI 02903
phone: (401) 444-6237
fax: (401) 444-5456
e-mail: Mshapiro@lifespan.org

A Case Study: Pedestrian–Motor Vehicle Trauma

Thomas F. Morgan, MD

Injury data in the United States estimate that 7,000 pedestrians are killed 110,000 pedestrians non-fatally injured per year.¹ Such injuries and their sequelae are often considered “accidents” and treated differently than diseases with treatable and preventable causes. However, one can utilize biomedical science to analyze the mechanism of injury and then delineate causation factors to develop injury prevention strategies. Landmark work by William Haddon^{2,3} has taught us that injury prevention can occur at three different points: pre-event, the event and post-event. Clearly, if we are to prevent more pedestrian injuries, we must focus on all three phases. Fortunately, a renewed interest in determining the basic biomechanics of pedestrian injuries has increased our understanding of these events. This article discusses a case of a pedestrian injury, the clinical application of the biomechanics of the injury, and the application of injury prevention strategies.

CASE PRESENTATION

J. M., a forty-four year old female pedestrian, was crossing Canal Street around 6:30 p.m., outside the crossing walk, when the front of a 1988 Nissan hit the left side of her body. It was reported that her upper body went on to the hood of the car, with her head contacting the windshield. The car carried her for sixty to seventy feet, then threw her to the street pavement. (Figure 1). EMS and Rhode Island Hospital emergency teams reported that she initially was disoriented, with prolonged amnesia and scalp abrasions. She had a left distal third tibia/fibular fracture, fractures of the pubic ramus and the left sacrum. There was a left pelvic hematoma. She required prolonged hospitalization, but eventually returned to work. Three years post-crash, J.M. complained of left sciatica, left foot weakness and neurogenic bladder. These findings were related to the pelvic and sacral fractures and hematoma from her crash injuries.

DISCUSSION

The concept of injury causation relates the mechanism of injury to the traumatic event. J.M.’s scalp bruising, brain concussion, pelvic fractures and left lower leg fractures are consistent with a trauma kinematics of body rotation on to the car and the anatomic patterns for a pedestrian strike; first contact to the left lower extremity, then to the pelvis, followed by the left side of the body on to the hood of the car with a head contact to the windshield and subsequent contact to the pavement. (Figure 1). By considering injury mechanisms in traumatic conditions, physicians and health care teams can develop strategies to identify injuries that are overlooked or misrepresented. By understanding the mechanism of injury from this crash, health care providers can predict injury patterns and the likelihood of subsequent neurogenic injury. Employing the concepts of secondary injury prevention can avoid possible long-term complications and disability. This case also points to prevention strategies pre-event: encouraging pedestrians to use crosswalks and wear bright clothing at dusk, and encouraging cities to maintain bright street illumination.

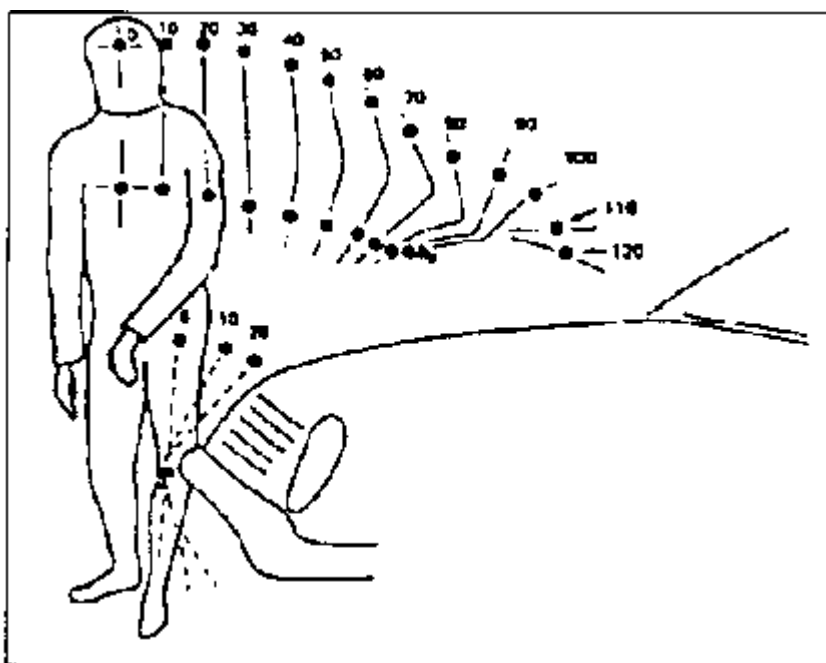


Figure 1: Pedestrian – Motor Vehicle impact kinetics. (From Eubanks, j. et al, “Pedestrian Involved in a Traffic Collision Reconstruction Methodology” Society of Automotive Engineers Technical Paper No. 92159.)

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Thomas Morgan, MD, is a Clinical Assistant Professor, Brown Medical School.

CORRESPONDENCE:

Thomas F. Morgan, MD
54 Jefferson Blvd.
Warwick, RI 02888
phone: (401) 467-7720
fax: (401) 467-4550



Surgical Infection Prevention – the New Medicare Quality Improvement Project

Dede Ordin, MD, MPH, and Madeleine Deschenes, MS

The Centers for Medicare and Medicaid Services (CMS) and the Centers for Disease Control and Prevention (CDC) have initiated a national quality improvement effort to prevent postoperative infection. In Rhode Island, this project will begin in November, when Rhode Island Quality Partners (RIQP), the Medicare Quality Improvement Organization for Rhode Island, begins its new contract with CMS. The goal of the Surgical Infection Prevention (SIP) project is to improve the selection and timing of prophylactic antibiotics for Medicare beneficiaries undergoing specific procedures for which data, guidelines, and national consensus overwhelmingly support such prophylaxis. These procedures include coronary artery bypass graft (CABG), cardiac surgery, colon surgery, hip and knee arthroplasty, abdominal and vaginal hysterectomy and selected vascular procedures such as aneurysm repair, thromboendarterectomy and vein bypass.

Surgical site infections occur in 2-5% of clean extra-abdominal and up to 20% of intra-abdominal surgeries.¹ Patients who develop surgical site infections are 60% more likely to be readmitted to the hospital and have twice the mortality.² Each infection increases the hospital stay by an average of 7 days and adds over \$3,000 in charges (1992 data).³ Appropriate preoperative administration of antibiotics has been shown to be effective in preventing infection, and thus decreasing patient morbidity, mortality and length of stay. In addition, it is estimated that, if a hospital with 10,000 operations per year could decrease their rate of surgical site infections from 300 per year to 150 per year there would be an average annual cost savings of approximately \$450,000.⁴

The objectives for the SIP project are to:

** Increase the proportion of patients who receive prophylactic antibiotics within one hour before surgical incision.*

Antimicrobial prophylaxis is most effective when provided prior to incision. The risk of infection increases when the antibiotic is administered too early (more than two hours prior to incision) or too late (after initial incision). The recommended time for administration is 30-60 minutes prior to incision.⁵

** Increase the proportion of patients given a prophylactic antibiotic consistent with current recommendations.*

The list of recommended antibiotics for this project has been derived from guidelines published by the Infectious Diseases Society,⁶ the CDC⁷ and the American Society of Health-System Pharmacists (ASHP).⁸

** Increase the proportion of patients receiving prophylactic antibiotics whose antibiotics were discontinued within 24 hours after surgery.*

Studies have shown that a brief course of antimicrobial prophylaxis, initiated shortly before the first incision is as effective as longer courses.⁹ Additionally, prolonged antibiotic use has been associated with superinfection with *Clostridium difficile* and may impact the development of resistant strains of bacteria.¹⁰

The specifications for the quality measures used to track achievement of these objectives are shown in Tables 1 & 2. These measure are also being considered by the Joint Commission on Accreditation of Health Care Organizations (JCAHO) for inclusion in their ORYX initiative, which requires hospitals to measure and improve designated processes of care as a condition of accreditation.

Studies have demonstrated a marked need for improvement in the appropriate use of prophylactic antibiotics. Preliminary data from 20 states (not including Rhode Island)

**Table 1: QUALITY INDICATORS – CMS/CDC
Surgical Infection Prevention Project**

Measurement population:

Inclusions: Medicare discharges with a primary or secondary procedure code of selected surgeries. ICD-9 CM procedure codes include: 36.10-36.14, 36.19, 36.15-36.17, 36.2, 35.0-35.95, 35.98, 35.99, 45.00, 45.03, 45.41, 45.49, 45.50, 45.7-45.90, 45.92, 45.95, 46.03, 46.04, 46.1-46.14, 46.52, 46.75, 46.76, 46.91, 46.92, 46.94, 48.5, 48.6-48.69, 81.51, 81.52, 81.54, 68.3, 68.4, 68.6, 68.8-68.89, 68.7, 38.34, 38.36, 38.37, 38.44, 38.48, 38.49, 38.51, 38.52, 38.64, 38.14, 38.16, 38.18, 39.25, 39.26, 39.29.

Exclusions: Evidence of pre-operative infection, which includes any of the following:

- Patient was on antibiotics at the time of admission except for patients undergoing colon surgery who were on oral antibiotics.
- Patient was being treated for an infection prior to the first surgical procedure of interest
- Patient had all antibiotic start dates missing for antibiotics administered during hospitalization.
- Patient was given antibiotics more than 24 hours prior to surgical incision time except for patients undergoing colon surgery who were on oral antibiotics

**Table 2: QUALITY INDICATORS – CMS/CDC
Surgical Infection Prevention Project**

Proportion of patients who receive antibiotics within 1 hour before surgical incision.

Denominator: Patients meeting general and indicator-specific inclusion-exclusion criteria

Numerator: Patients receiving antibiotics within 1 hour before surgical incision

Cases excluded from indicator:

- ♦ Patients undergoing colon surgery who were given prophylactic oral antibiotic only
- ♦ Unable to determine if antibiotic started within 1 hour of surgery start time due to missing time values

Proportion of patients who receive prophylactic antibiotics consistent with current recommendations.

Denominator: Patients meeting general and indicator-specific inclusion-exclusion criteria who are given prophylactic antibiotics (i.e., antibiotics given pre-op, intra-op, or within 24 hours after surgical closure time)

Numerator: Patients given prophylactic antibiotics consistent with current recommendations*

Cases excluded from indicator:

- Patients not receiving any antibiotics before, during, or within 24 hours after surgery end time (i.e., patient did not receive any prophylactic antibiotics).

*For list of recommended antibiotics, see www.surgicalinfectionprevention.org

Proportion of patients whose prophylactic antibiotics were discontinued within 24 hours of surgery end time.

Denominator: Patients meeting general and indicator-specific inclusion/exclusion criteria who are given prophylactic antibiotics (i.e., antibiotics given pre-op, intra-op, or within 24 hours after surgical closure time)

Numerator: Patients whose prophylactic antibiotics were discontinued within 24 hours of surgery end time

Cases excluded from indicator:

- ♦ Patients diagnosed and treated for infections within 2 days of surgery end date.
- ♦ Patient not receiving any antibiotics during hospitalization.
- ♦ Patient not receiving any antibiotics before, during, or within 24 hours after surgery end time (i.e., patient did not receive any prophylactic antibiotics);

Unable to determine if all prophylactic antibiotics were discontinued within 24 hours of surgery end time due to missing time values.

indicate an overall rate of 47% for antibiotics within one hour before incision, 92% for antibiotic consistent with guidelines and 40% for antibiotics discontinued within 24 hours.

Baseline measurement for Rhode Island hospitals, entail- ing abstraction of data from 750 cases randomly selected from eligible Medicare discharges throughout the state from April 2001 through September 2001, is underway. Statewide progress over the 3-year project will be tracked by quarterly abstraction of 125 medical records. Hospitals undertaking improvement efforts are likely to abstract additional charts to assess the effectiveness of their efforts.

RIQP and a hospital in Rhode Island are participating in a National Institute for Healthcare Improvement (IHI) Col- laborative to achieve breakthrough improvement in preven- tion of surgical infections. Processes of care addressed in this collaborative include the delivery of appropriate and timely prophylactic antibiotics as well as glucose control, mainten- ance of normothermia, oxygenation, and other infection-preven- tion procedures. RIQP will be sharing with interested hospi- tals the materials and improvement strategies as well as lessons

learned during the course of this national collaborative. They will also initiate a state- wide IHI-type collaborative for all Rhode Island hospitals interested in using this highly effective model for improving qual- ity of care. Anyone interested in more in- formation should contact Dede Ordin, MD, MPH, Senior Medical Scientist, or Madeleine Deschenes, MS, Project Coor- dinator, RIQP, phone: (401) 528-3200.

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Dede Ordin, MD,MPH, is a Senior Medical Scientist at RIQP.

Madeleine Deschenes, MS, is a Project Coordinator at RIQP.

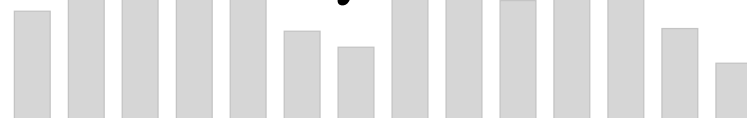
CORRESPONDENCE:

Dede Ordin, MD, MPH
Madeleine Deschenes, MS
phone: (401) 528-3200
fax: (401) 528-3210
e-mail: ripro.mdeschenes@sdps.org
e-mail: ripro.dordin@sdps.org
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The author assumes full responsibility for the accuracy and com- pleteness of the ideas presented. This article is a direct result of the Health Care Quality Improvement Program initiated by the Centers for Medicare & Medicaid Services, which has encouraged identifica- tion of quality improvement projects derived from analysis of patterns of care, and therefore required no special funding on the part of this Contractor. Ideas and contributions to the author concerning experi- ence in engaging with issues presented are welcomed.

Health by Numbers



Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health

Edited by Jay S. Buechner, PhD

Asthma Mortality in Rhode Island and the United States, 1979-1998

Leanne C. Chiaverini and Jay S. Buechner, PhD

Several recent studies have indicated an increase in United States (US) asthma mortality rates over the past two decades,^{1,2} and accordingly, the national *Healthy People 2010* objectives for asthma mortality are aggressive.³ (Table 1) In contrast, Rhode Island (RI) rates have been level over the period,⁴ and in 1994-1998, RI was either below or very near each of the nation's five age-specific objectives for asthma mortality.³ (Table 1) This report analyzes the differential between RI and US asthma mortality rates, independently and in relation to mortality from all respiratory diseases.

Methods

Using the Centers for Disease Control and Prevention (CDC) WONDER System's Compressed Mortality Files,⁵ RI and US age-adjusted mortality rates for asthma

as the underlying cause of death (ICD-9 code 493) were obtained for the years 1979 through 1998. Average annual rates for the white population were produced for the five-year periods 1979-1983, 1984-1988, 1989-1993, and 1994-1998. All rates were age-adjusted to the 2000 standard US population and reflect average annual number of deaths per million population. Rates for males, females, and both genders combined were examined.

RI and US age-adjusted mortality rates from 1979 to 1998 for total respiratory diseases (ICD-9 code 460-519), emphysema (ICD-9 code 492), and chronic bronchitis (ICD-9 code 491) were extracted using the same methods as described for asthma mortality rates. [Note: Mortality rates for emphysema and chronic bronchitis were examined only to investigate whether erroneous death classification

of asthma deaths to other respiratory illnesses could be responsible for the decrease in RI age-adjusted asthma mortality rates. In both cases, RI and US rates were parallel over time, suggesting that the increasing differential between RI and US asthma mortality was not an artifact of classification.]

Because of the small number of asthma deaths among races other than white in RI, mortality rates for these groups were statistically unreliable and have not been included in the analysis.

Results

From 1979 to 1998, 245 RI residents died as a result of asthma. The majority of deaths were among whites (221), among women (154), and among persons ages 65 and over (145). The distribution of asthma deaths among sub-populations changed little over time.⁵

Comparison between age-adjusted

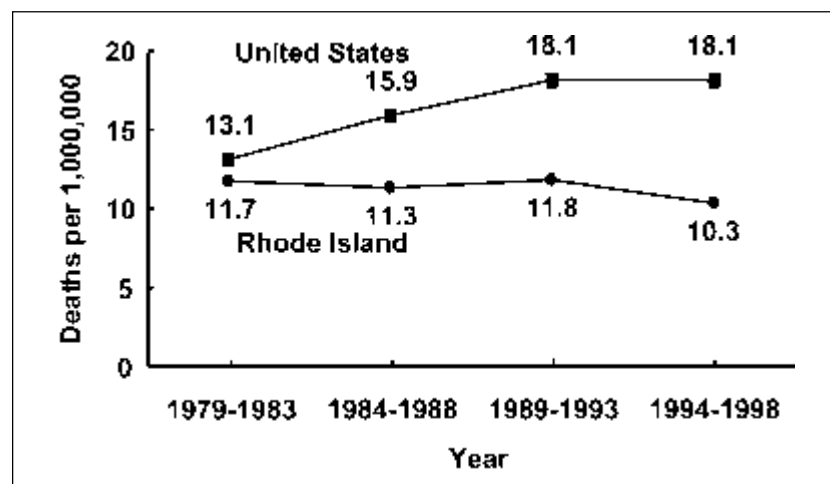


Figure 1. Age-adjusted asthma mortality rates per 1,000,000 whites, Rhode Island and United States, 1979-1998.

| Objective | Age Group | U.S. 1998 baseline | U.S. 2010 Target Rate per Million | Rhode Island 1994-1998 |
|-----------|--|--------------------|-----------------------------------|------------------------|
| 24-1a | Children under age 5 years | 2.1 | 1.0 | 0.0 |
| 24-1b | Children aged 5 to 14 years | 3.3 | 1.0 | 0.0 |
| 24-1c | Adolescents and adults aged 15 to 34 years | 5.0 | 2.0 | 2.1 |
| 24-1d | Adults aged 35 to 64 years | 17.8 | 9.0 | 10.8 |
| 24-1e | Adults aged 65 years and over | 88.3 | 60.0 | 46.4 |

Sources: Healthy People 2010 Objectives for Improving Health; CDC WONDER's Compressed Mortality Files

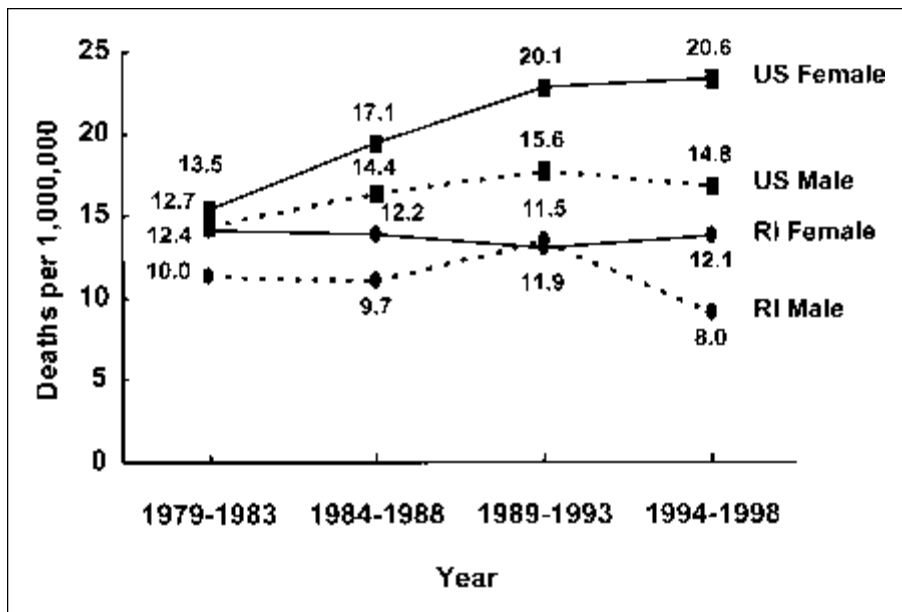


Figure 2. Age-adjusted asthma mortality rates per 1,000,000 whites, by sex, Rhode Island and United States, 1979-1998.

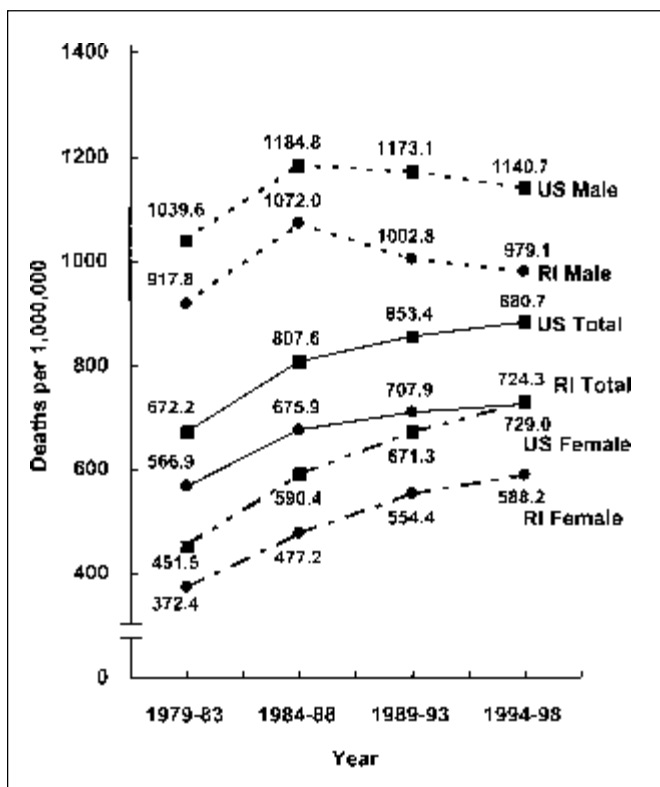


Figure 3. Age-adjusted total respiratory disease mortality rates per 1,000,000 whites, by sex, Rhode Island and United States, 1979-1998.

asthma mortality rates of whites in RI and the US from 1979 to 1998 showed that RI rates were consistently lower than those for the US. (Figure 1) RI rates decreased by 12% from 1979-83 to 1994-98. US rates increased by 38% from 1979-83 to 1989-93 and changed little in 1994-98. In 1979-83, the US rate was 12% higher than the RI rate; by 1994-98 the US rate was 76% higher.

Among white males, asthma mortality in both RI and

the US peaked during 1989-93 and fell in 1994-98. (Figure 2) However, from 1979-83 to 1994-98, RI rates had an overall decrease of 20%, while US rates increased by 17%. Rates for white females were generally higher than rates for white males. Among white females in RI, the rate changed little over the period of observation, while the US rate increased by 53% from 1979-83 to 1994-98.

In RI, asthma accounts for approximately 2% of all respiratory disease mortality. The RI rate for total respiratory disease mortality among whites increased 28% from 1979-83 to 1994-98. (Figure 3) By sex, RI rates for white females increased greatly (58%) from 1979-83 to 1994-98. Rates for white

males in RI decreased from 1984-88 to 1994-98, but overall increased by 7%. Over the entire period of observation, US rates were consistently higher than RI rates. In 1979-83, the RI rate was 16% below the US rate; by 1994-98 the RI rate was 18% lower than the US rate.

Discussion

From 1979 through 1998, both asthma and total respiratory disease mortality rates for RI were below those of the United States. While the trends in total respiratory disease mortality for RI and US were similar, a diverging trend was seen for asthma mortality. In general, RI rates for asthma mortality were flat or decreasing while US rates were climbing.

Among the possible causes of the observed trend in RI asthma mortality rates are: (1) A decrease in asthma morbidity is possible but unlikely because RI currently has one of the highest asthma morbidity rates in the country.⁶ (2) A change in the level of exposure to environmental triggers, such as wet and damp housing and school environments, is a potential explanation. However, there is no known information showing that environmental exposure to asthmatic triggers in RI is getting better either absolutely or relative to the US as a whole. (3) Asthma mortality rates may have fallen because of an improvement in the quality of or access to medical care in RI. (4) Improvement in influenza and pneumococcal vaccination rates is a likely hypothesis. Persons with asthma are considered to be at high risk for influenza complications. Over the past ten years, RI and US mortality rates for these illnesses have decreased⁵ and vaccination rates have increased.⁷ In order to investigate this possibility, future studies may wish to collect and analyze data on influenza and pneumococcal vaccination rates among persons with asthma and among decedents whose cause of death is asthma.

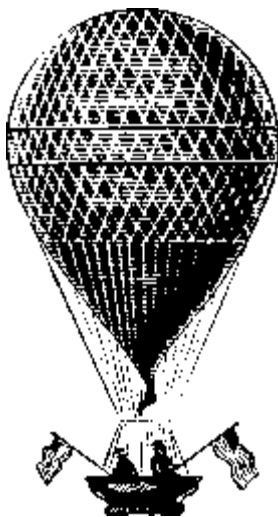
Leanne C. Chiaverini is Research Associate, Asthma Control and Cancer Control Programs, Division of Disease Prevention and Control, Rhode Island Department of Health.

Jay S. Buechner, PhD, is Chief, Office of Health Statistics, and Clinical Assistant Professor of Community Health, Brown University School of Medicine.

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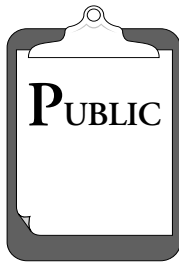
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The Prevalence of HIV and AIDS Among High-Risk Populations in Rhode Island, 2002

John P. Fulton, PhD, Leanne Chiaverini, Paul Loberti, MPH, Lucille Minuto, BSN, MEd

PURPOSE

As part of an annual epidemiological profile on HIV and AIDS in Rhode Island, the Rhode Island Department of Health estimated the prevalence of HIV and AIDS in two sub-populations known to be at high risk for HIV infection, gay/bisexual men and injecting drug users (IDU). The prevalence of an infectious disease in a population is an important indicator of disease risk in that population, and an important consideration for the distribution of scarce public health resources among populations.

BACKGROUND

The incidence of AIDS in Rhode Island increased from 1982 to 1993, then declined, probably as a result of improved screening and treatment of HIV. Mortality from AIDS in Rhode Island followed a similar trajectory. Trends throughout the United States have been similar. As a result of declining mortality, the prevalence of AIDS has increased steadily. In Rhode Island, the number of persons living with AIDS reached an all-time high of 1019 in July, 2002.¹

METHODS

The age-specific period prevalence of HIV/AIDS in 2002 was estimated for two high-risk populations in Rhode Island, the population of gay or bisexual men ages 20 and over, and the population of injecting drug users ages 20 and over, as follows:

$$\text{Period Prevalence}_{(a,r)} = N_{(a,r)} / P_{(a,r)}$$

where:

N = Number of Rhode Island residents living with AIDS or HIV at any time from January 1, 2002 through June 30, 2002.

P = Number of Rhode Island residents, mid-2002.

a = Age group.

r = Risk group.

PERSONS WITH AIDS

The number of Rhode Island residents living with AIDS at any time during 2002, by age and risk group, was obtained from the Rhode Island AIDS registry, established and maintained by the Rhode Island Department of Health.

PERSONS WITH HIV

Until 2000, the Rhode Island HIV registry, established and maintained by the Rhode Island Department of Health, collected reports of anonymous HIV+ test results, only. Given the strict anonymity of these reports, it is impos-

sible to do two things which are necessary to determine the number of Rhode Island residents living with HIV: 1/ to identify duplicate test results (many individuals who test positive for HIV get retested, sometimes more than once), and 2/ to ascertain the disease and vital status of persons who have received an HIV+ test result over time. Beginning in 2000, HIV+ reports made to the Rhode Island HIV registry have included unique identifiers, making both procedures possible. However, with only two years' unique identifier data available in the registry, it is impossible to determine the number of Rhode Island residents living with HIV who have not converted to AIDS.

The ratio $(N_{(HIV+)} + N_{(AIDS)}) / N_{(AIDS)}$ may be estimated from the aggregate statistics of states that have run confidential ("name" or "unique identifier") HIV and AIDS registries simultaneously for many years. $(N_{(HIV+)})$ represents the number people living with HIV who have not converted to AIDS; $N_{(AIDS)}$ represents the number of people living with AIDS.) The Centers for Disease Control and Prevention (CDC) constructed estimates of $(N_{(HIV+)} + N_{(AIDS)})$ and $N_{(AIDS)}$ for the United States as a whole in 2000:²

$$(N_{(HIV+)} + N_{(AIDS)}) = 850,000-950,000$$

$$N_{(AIDS)} = 340,000$$

Thus:

$$(N_{(HIV+)} + N_{(AIDS)}) / N_{(AIDS)} = 2.5-2.8$$

This ratio range may be applied to $N_{(AIDS)}$ for Rhode Island as determined by the AIDS registry to produce a range of $(N_{(HIV+)} + N_{(AIDS)})$ estimates for the State. We selected the midpoint of the range, 2.65, for construction of the prevalence estimates presented in this report.

GAY/BISEXUAL MEN

Various estimates of the gay/bisexual male population in the United States have been constructed since publication of the Kinsey Report in 1948. Although useful estimates may be derived in various ways, most have been based on surveys of the general population, and vary according to the questions asked of respondents. For example, the following questions yield progressively smaller estimates of the proportion of adult males who are gay/bisexual:

- "Have you had at least one same-sex partner since age 18?"
- "Have you had more same-sex than opposite-sex partners since age 18?"
- "Have you had same-sex and opposite-sex partners in the last year?" or "Have you had exclusively same-sex partners over the past year?"

Survey estimates are also affected by the universe from which the sample of respondents is drawn. The Kinsey study,³ which drew respondents from various settings, including prisons and reform schools, yielded an estimate of 10%, while the General Social Survey,⁴ which drew respondents exclusively from the non-institutional population, yielded a maximum estimate of 5%.

Finally, the applicability of national estimates to smaller geographic settings varies widely. For example, the proportion of the male population that is gay/bisexual varies widely among large urban settings in the United States, based on historical settlement patterns, "gay-friendly" policies, and other factors.

On the basis of three national studies,⁴⁻⁶ we estimated the proportion of adult Rhode Island males who have had same-sex partners in the last year as 2.8%. This compares well with two independent, conservative estimates of the proportion of adult Rhode Island males who are gay/bisexual, one based on US Census data for Rhode Island in 2000 (2.3%)⁷ and the other on numbers of clients of businesses serving the gay community in Rhode Island (2.4%).⁸

IV DRUG USERS

In 2000, the proportion of the adult, non-institutionalized United States population that reported any (lifetime) use of illicit needles to inject drugs as respondents to the National Household Survey on Drug Abuse was 1.2%.⁹

RHODE ISLAND RESIDENTS, 2002

Counts of the Rhode Island population by age and sex were obtained from the US Censuses of Population, 1990 and 2000, and estimated for 2002 using sex-age-specific linear projection.¹⁰

RESULTS

The estimated prevalence of HIV/AIDS among all Rhode Islanders in mid-2002 was 0.35%. Among Rhode Island men in mid-2002, the estimated prevalence was slightly higher, 0.54%. In both groups, the prevalence rate varied by age group, peaking among people ages 30 to 39. [Table 1]

The estimated prevalence of HIV/AIDS was considerably higher among injecting drug users (12.24%) than among all Rhode Islanders (0.35%), and considerably higher among Rhode Island men of gay/bisexual orientation (9.27%) than among all Rhode Island men (0.54%). Almost a third of injecting drug users ages 30-39 and about

a fifth of gay/bisexual men ages 30-39 may suffer from HIV/AIDS, according to these estimates. [Table 1]

ASSESSMENT

Injecting drug users and gay/bisexual men have estimated prevalence rates of HIV/AIDS between one and two orders of magnitude higher than all Rhode Islanders, and clearly justify the attention of public health planning and intervention efforts.

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John P. Fulton, PhD, is Associate Director of Health, Division of Disease Prevention and Control, Rhode Island Department of Health, and Clinical Associate Professor of Community Health, Brown Medical School.

Leanne Chiaverini is Research Associate, Asthma Control and Cancer Control Programs, Division of Disease Prevention and Control, Rhode Island Department of Health.

Paul Loberti, MPH, is Chief, Office of HIV & AIDS, Division of Disease Prevention and Control, Rhode Island Department of Health.

Lucille Minuto, BSN, MEd, is Assistant Administrator, Office of HIV & AIDS, Division of Disease Prevention and Control, Rhode Island Department of Health, and Adjunct Instructor of Health Education, Rhode Island College.

Table 1. Estimated prevalence of HIV/AIDS among high-risk populations, Rhode Island, 2002, by age group, ages 20 and over

| Ages | Prevalence (%) and Risk Group | | | |
|-------------|-------------------------------|---------|--------|------------|
| | All People | All Men | IDU | Gay/Bi Men |
| 20-29 | 0.28% | 0.37% | 7.49% | 7.13% |
| 30-39 | 0.81% | 1.16% | 29.97% | 20.65% |
| 40-49 | 0.46% | 0.78% | 18.14% | 12.51% |
| 50+ | 0.07% | 0.13% | 1.98% | 1.92% |
| Total (20+) | 0.35% | 0.54% | 12.24% | 9.27% |

– A Physician's Lexicon –



The Arabic Connection

A rudimentary knowledge of Greek and Latin is generally sufficient to unravel the meanings of most of the terminology employed in biology and medicine. There are, however, a small number of words taken from non-Mediterranean language sources, particularly the names of certain medicinal herbs, tropic diseases and the invertebrate vectors of these tropical diseases.

Asiatic and African languages have contributed words such as kala azar, kuru, amok, beri-beri, kwashiokor, chaulmoogra oil, agar, loa loa, tse-tse fly and tsutsugamushi fever; from native American sources, words such as quinine, cocaine, curare, peyote, jalap and ipecac; and from Caribbean languages, words such as guaiaic and yaws.

And then there are the many words of Arabic origin, reflecting those earlier centuries when Arabic writings and Arabic physicians dominated the advancements in pharmacology and clinical medicine.

Caffeine carries a Latin suffix but its root comes from the Arabic, *qahwah*, meaning coffee. It is derived from an earlier Turkish word *kahveh*, which in turn is said to be named for the Ethiopian district of Kaffa from whence some of the earliest coffee beans were harvested.

Many commonly employed technical terms beginning with the prefix *al-* or *el-* are of Arabic origin, and are equivalent to the English word, "the." Alcohol, for example, is derived from *al-khol*, literally, the antimony, but metaphorically signifying the

fineness of antimony powder, which was held to be symbolic of the highly rectified spirits of alcohol.

The word elixir, a clear, sweetened, often alcoholic preparation used as an oral medication, comes from the Arabic *al-iksir*, literally, the dry substance, a reference to the powders which Arabic physicians had mixed into an alcohol base to form their elixirs. The *-iksir* root, meaning dry, is traced back to an earlier Greek root *xero-* also meaning dry, as in technical terms such as xeroderma [dry skin], xerophthalmia [dry conjunctiva], xerostomia [dry mouth] and xerography [dry printing]. The *xero-* root is also the basis for the English words "serene" and "serenity" [in the sense of dry, cloudless intervals].

Not all words beginning with *al-* are necessarily of Arabic origin. Words such as albumen [egg white] or albino are derived from the Latin, *albus*, meaning white.

None of these assignments to languages of origin are clearcut. A word such as cholera, for example, is directly derived from the Latin, *cholera* [meaning anger], which in turn comes from the Greek, *chole* [meaning bile or yellowish-green]; and this, in turn, is traced back to an Iranian-Avestic word, *azar*, meaning bile or yellow. And the Avesta language of western Asia is probably a derivative of still earlier Indic sources.

– STANLEY M. ARONSON, MD, MPH



Vital Statistics

Rhode Island Department of Health

Patricia A. Nolan, MD, MPH, Director of Health

Edited by Roberta A. Chevoya

Rhode Island Monthly Vital Statistics Report

Provisional Occurrence Data
from the
Division of Vital Records

| Underlying Cause of Death | Reporting Period | | | |
|--------------------------------------|------------------|------------------------------------|-----------|-----------|
| | October 2001 | 12 Months Ending with October 2001 | | |
| | Number (a) | Number (a) | Rates (b) | YPLL (c) |
| Diseases of the Heart | 238 | 3,068 | 292.7 | 4,529.5** |
| Malignant Neoplasms | 184 | 2,406 | 229.5 | 7,383.5 |
| Cerebrovascular Diseases | 46 | 534 | 50.9 | 757.5 |
| Injuries (Accident/Suicide/Homicide) | 32 | 394 | 37.6 | 7,086.5** |
| COPD | 32 | 502 | 47.9 | 470.0 |

| Vital Events | Reporting Period | | |
|--------------------------|------------------|----------------------------------|--------|
| | April 2002 | 12 Months Ending with April 2002 | |
| | Number | Number | Rates |
| Live Births | 1,012 | 13,396 | 12.8* |
| Deaths | 811 | 10,202 | 9.7* |
| Infant Deaths | (4) | (106) | 7.9# |
| Neonatal deaths | (3) | (90) | 6.7# |
| Marriages | 553 | 8,058 | 7.7* |
| Divorces | 238 | 3,268 | 3.1* |
| Induced Terminations | 463 | 5,553 | 414.5# |
| Spontaneous Fetal Deaths | 96 | 1,062 | 79.3# |
| Under 20 weeks gestation | (90) | (975) | 72.8# |
| 20+ weeks gestation | (6) | (87) | 6.5# |

(a) Cause of death statistics were derived from the underlying cause of death reported by physicians on death certificates.

(b) Rates per 100,000 estimated population of 1,048,319

(c) Years of Potential Life Lost (YPLL)

Note: Totals represent vital events which occurred in Rhode Island for the reporting periods listed above. Monthly provisional totals should be analyzed with caution because the numbers may be small and subject to seasonal variation.

* Rates per 1,000 estimated population
** Excludes one death of unknown age.

Rates per 1,000 live births

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NINETY YEARS AGO

[OCTOBER, 1912]

Herbert Terry, MD, in "Causes of Cystitis," supported the statement of Dr. Cabot of Boston, who earlier had told the Rhode Island Medical Society that cystitis was rarely "a disease in itself," but was generally due "to pre-existing disease elsewhere." Dr. Terry discussed three cases of cystitis.

1) A 60 year-old man had acute or chronic prostatitis or seminal vesiculitis. For treatment, "except for opium and belladonna suppositories and hot water enemas during the first week of the treatment, nothing was done but massage of the prostate and vesicles." 2) A young woman had an infection of the genitourinary tract with colon bacillus. For her treatment, "the kidney pelves were washed out once in three days for 3 weeks with aluminum acetate solution....then for a time with 25% solution of argyrol, and finally with 3 drops of formalin to the ounce of water." 3) For the last case, a 24 year-old man had 2 large tubercular foci in his left kidney. The treatment was a nephrectomy.

H.B. Sanborn, MD, in "Some Considerations on the Treatment and Prevention of the Syphilitic and Parasyphilitic Diseases of the Nervous System," gave measured approval to salvarsan: "Since salvarsan came into use we have at our command another powerful antisyphilitic remedy, but I do not consider it any more of a specific against syphilis than mercury." Dr. Sanborn, Assistant Neurologist to Rhode Island Hospital, proclaimed syphilis curable, urging that local health departments emulate New York City's Board of Health, which instituted public education, widespread availability of tests, and special hospital wards.

FIFTY YEARS AGO

[OCTOBER, 1952]

Wendell T. Caraway, PhD, a biochemist, Department of Pathology, Rhode Island Hospital, reviewed the "fundamental principles," in "Electrolyte Balance and Fluid Therapy."

In "Administrative Problems in Air Pollution Control in Providence," Austin C. Daley, the Air Pollution Engineer for the City of Providence, praised both the Providence Medical Society and Mayor Walter Reynolds for their roles in initiating the city's air pollution regulations. He cited the paucity of examples (both on-site and written texts)

for effective air pollution regulations, as opposed to existing guidelines for water supply and sewerage regulations. Mr. Austin cited too the conflict-of-interest when the industry proposes regulations: "The chemical and allied industries are major contributors to the aerial contamination so therefore they, like the coal dealers, are very happy to draw up laws for air pollution control officials to follow."

An Editorial on the two Presidential candidates' campaign stances on national health insurance noted the "unqualified declaration against federal compulsory health insurance by the Republican Party, and from the Democratic Party a less moderate position than the one taken by President Truman, but at the same time no definite indication that compulsory health insurance would be unacceptable."

A second Editorial, on "The Doctor Draft," summarized current regulations, while hoping that "the Korean strife may be terminated within the year."

TWENTY FIVE YEARS AGO

[OCTOBER, 1977]

In "Message from the Dean," Stanley M. Aronson, MD, discussed "The Costs of Medical Education." He pointed out that before World War II "personal payment augmented by endowment" provided the major source of funds. During World War II the Armed Forces began to subsidize medical education. At Brown tuition paid one-third the costs of the education.

This issue included papers from a symposium on Biological and Medical Implications of Nuclear Power, held at Brown, March 1977. Arvin Glicksman, MD, provided the Introduction. Panelists included Victor P. Bond, MD: Biological Implications of Radiation ("With routine reactor operations' low dose and dose rates of radiation, exposure should produce no detectable effect"); Robert W. Miller, MD: Epidemiology Studies of Irradiated Populations (a summary of the pediatric illnesses linked to radiation); and Bernard T. Feld, PhD: Environmental Implications of Nuclear Power Production (He confessed to entering this era "with eyes open but also with some trepidation").